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The AUTOMOBILE

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No. 18

NEW YORK, MAY 2, 1918

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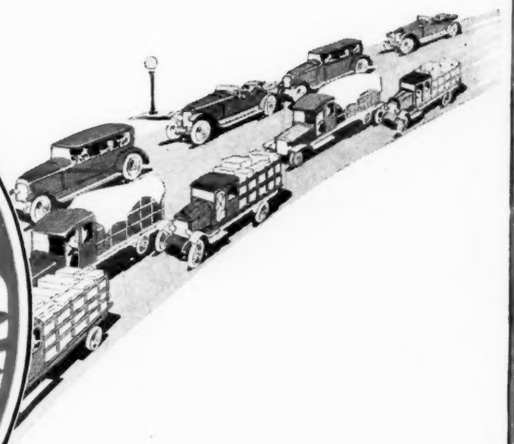

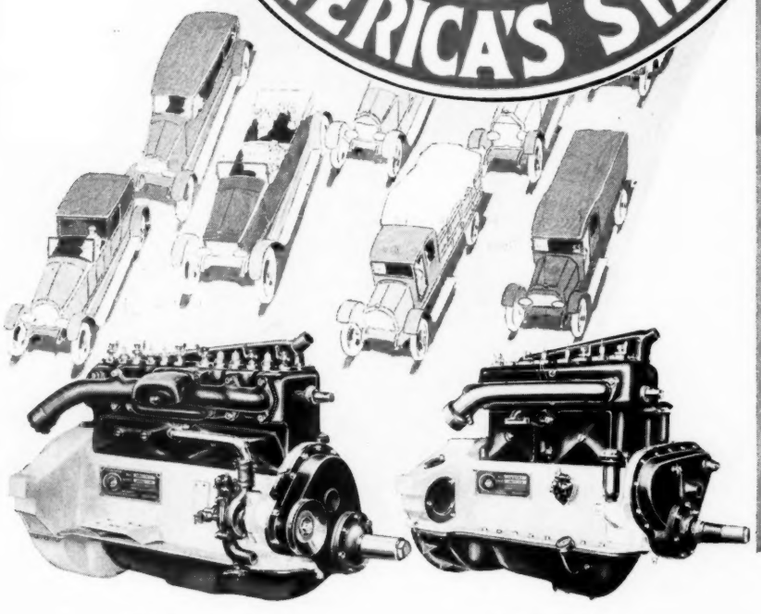

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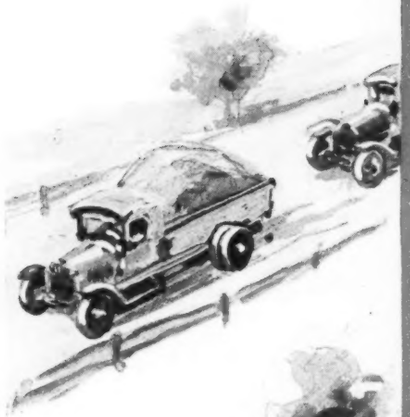

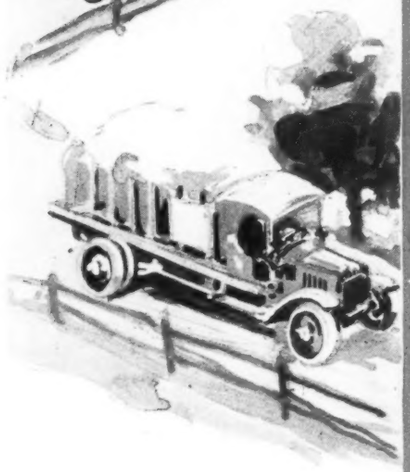

MASTER TRUCKS, Inc.
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AUTOMOTIVE INDUSTRIES
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VOL. XXXVIII NEW YORK—THURSDAY, MAY 2, 1918—CHICAGO No. 18

Wheel and Track-Laying Tractors Needed for War

Creeper Types Too Slow for Long Distances, Where Wheel Types Are Best—Convertible Designs Are Now Being Used

By W. F. Bradley

European Representative of AUTOMOTIVE INDUSTRIES

PARIS, FRANCE, April 1.—European military authorities are so jealous of the condition of their roads that every effort is made to prevent their use by caterpillar tractors and other track-laying tractors and by vehicles with straked wheels, or even by trucks with chains on their wheels. It is not always possible, however, to keep such vehicles off the road at all times, but great care is taken to see that caterpillar tractors do not travel unnecessarily over hard roads, and traffic police have instructions to cause chains to be removed when the condition of the road does not warrant their retention.

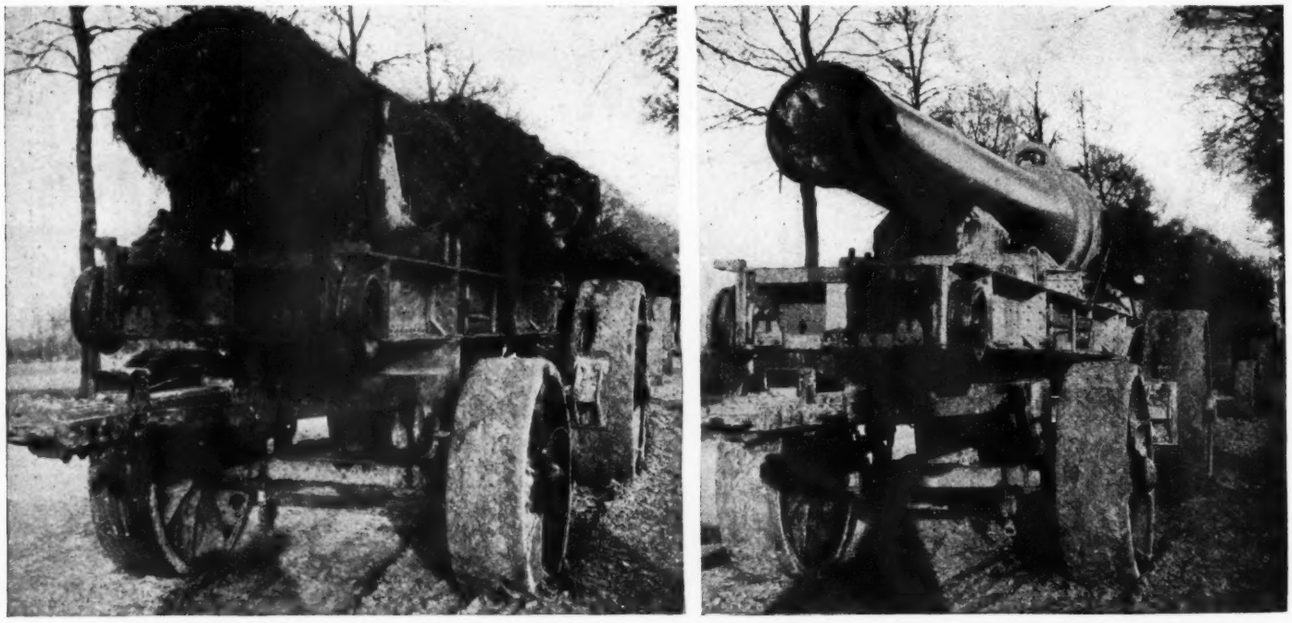
Because of the destruction done by caterpillar and track-laying tractors on made roads, the use has been developed of special trailers capable of receiving a caterpillar, this trailer being towed by a rubber-tired four-wheel-drive tractor. There is a double advantage in this: The rubber-tired tractor can easily average 10 m.p.h. on good roads, while the caterpillar rarely makes 3 m.p.h. The destruction of the road surface by the rubber-tired tractor is very slight, while that of the self-track-laying machine is considerable.

Track-layers Destroy Roads

Obviously this trailer is only made use of for long hauls, during which hard roads must be traversed. A change of position involving a journey of 30 miles will occupy 10 hours with a caterpillar or track-laying machine, while the same distance can be covered in not much more than three hours if the caterpillar is hauled by a four-wheel-drive tractor. This is of the utmost importance when gun positions have to be changed rapidly. The fields of usefulness of the two types of machines are quite distinct. For cross-country work, for getting guns into position, for dirt roads, the caterpillar type is supreme. But as soon as the gun has been removed from this environment and has to operate on highways, the full disadvantage of the track-laying device makes itself felt. Hence this new combination in which one type vehicle supplements the other. Usually the track-laying trailer is a two-wheeler with rubber tires. The advantages of this type over the four-wheeler are low weight, ease of loading, and cheaper construction. For specially heavy loads, wood wheels with steel tires are used in place of rubber, but the decided preference is towards rubber-shod trailers.

Some Types Made Convertible

Another development is the fitting of wheels to certain track-laying tractors and the provision of track-laying bands to certain types of ordinary trucks. Some of the new track-laying tractors, designed for special purposes, the nature of which need not be specified, have in addition to their endless bands a front axle with steering mechanism and a rear axle to which power is transmitted. Detachable cast steel wheels shod with solid rubber tires are attached to these axles, and when in position they raise the track-laying band off the ground. To put the wheels on, the front of the tractor is run onto suitable blocks of wood, thus throwing the nose of the machine up and giving the clearance necessary to fit the wheels. With the front wheels fitted the machine is backed down off its block and the rear end raised in the same way. Owing to the weight of the wheels necessary to carry a substantial track-laying tractor, block and tackle permanently attached to the chassis is provided for each wheel. A vehicle of this nature runs on rubber-tired wheels when hauling loads over ordinary roads;

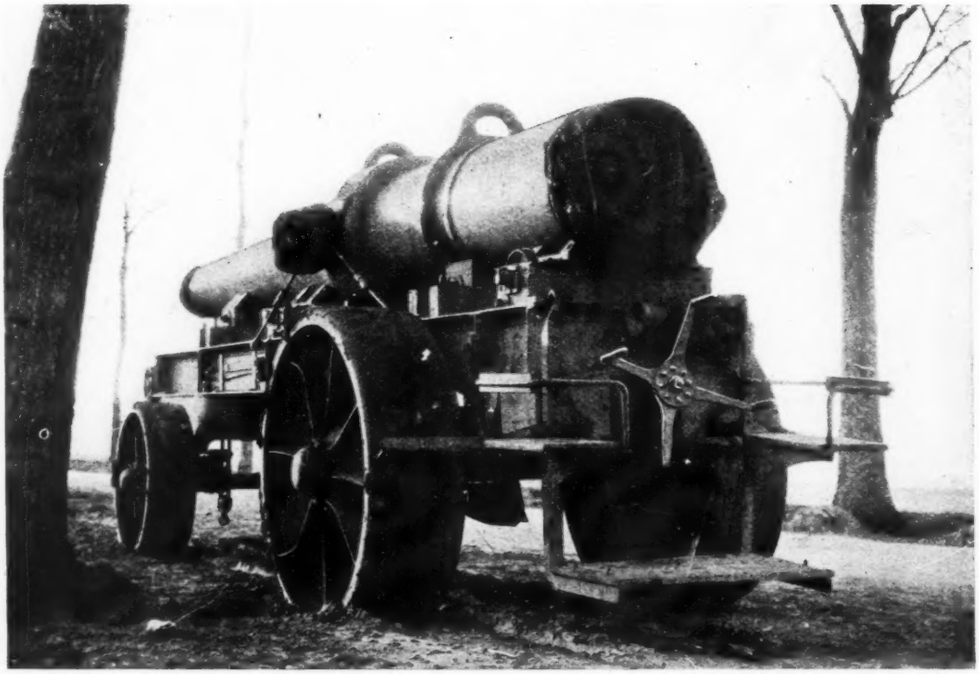


Left—A line of heavy guns with camouflage screens on them, mounted on special trailers and hauled by gasoline tractors. Right—One of the big guns mounted on a special trailer hauled by a gasoline tractor

its speed can be increased at least 50 per cent compared with its speed as a track layer. On reaching the zone where roads disappear, or on entering the district where it becomes necessary to go across country, the wheels are unshipped, mounted on brackets specially designed to receive them, and the vehicle becomes a track-layer.

This problem has also been tackled from the opposite end. Thus, instead of fitting emergency wheels to a caterpillar, emergency track-laying bands are attached to an ordinary truck. This attachment has been found useful for normal type 3 to 5-ton trucks which at times are called upon to operate away from all made roads, where nothing but a self-track layer will suffice. This device has been made use of on Delahaye chain-driven trucks, which are very similar mechanically to the American White; they have also been adopted to a certain extent on the four-wheel-drive, internal-gear Latil tractor. The track layer attached is especially designed for the truck on which it is applied; but no change is required on the truck other than the withdrawal of the wheel.

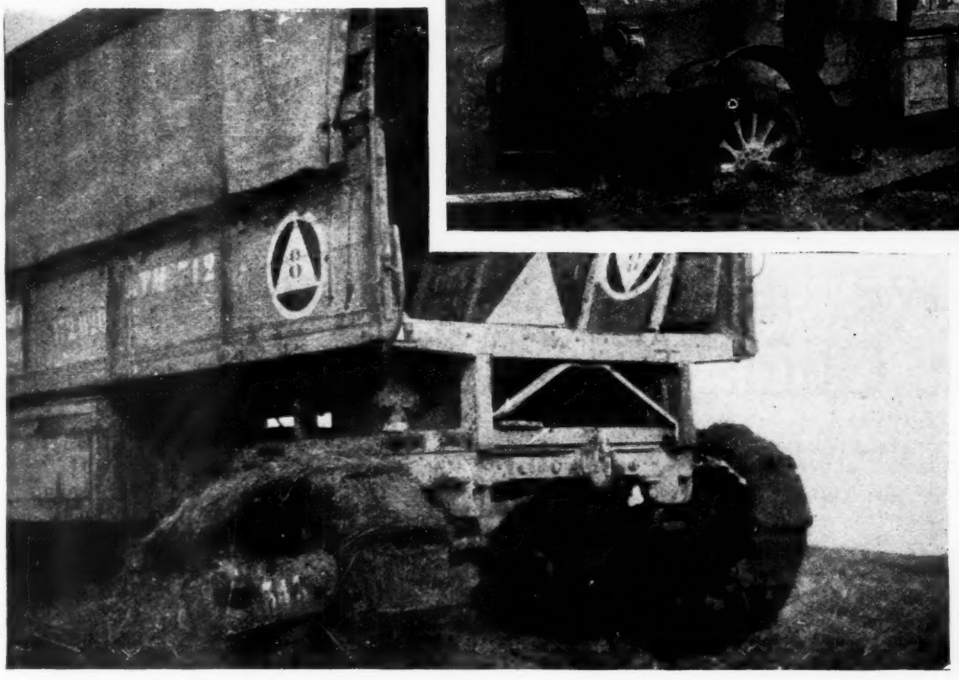
Used on a 3-ton truck the length of the track band in contact with the ground is about 36 in. A similar device is used in some cases for the front wheels, but is not altogether satisfactory, owing to the enormous drag on the steering gear by reason of the big surface in contact. The best use of this attachment has been found to be for emergency conditions in mountainous country. It happens that from time to time, it may be for a short period only, a truck has to reach some position almost inaccessible for the ordinary type of vehicle having power delivered to its rear wheels. Rather than make use of a track-laying machine, which is generally a tractor only with little load-carrying capacity, it has been found more advantageous to attach the track-laying device when conditions call for it.



Rear view of the huge gun shown above, mounted on a special trailer

Track-Laying Bands Used on Army Trucks in France

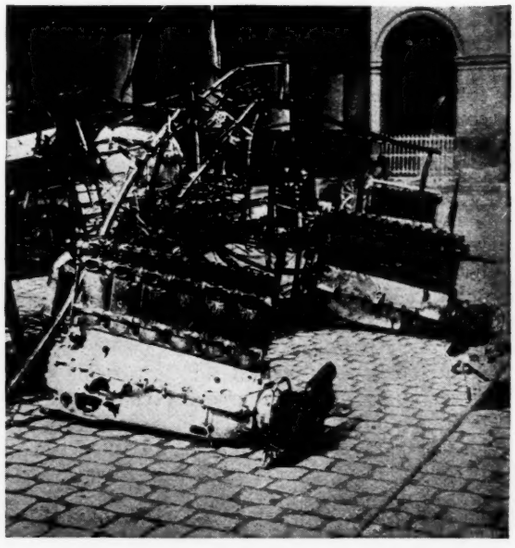
Are Raised Off the Ground When Wheels Are Attached



Delahaye army truck with track-laying bands experiencing rough cross-country going

Track-laying bands attached to ordinary chain-driven Delahaye truck

Junk Pile and War Trophies Look Almost Alike



The picture at the left shows a scene at the Paris Old Iron Fair held on the Boulevards. It looks a valueless heap, but there are doubtless many parts of value to motorcyclists. The picture on the right shows a captured Mercedes aviation engine on exhibit at the Invalides, Paris

Foreign Trade Advertising

"THE buying power of people in many countries where the per capita wealth to-day is very low will show an extraordinary change within the next 20 years. One of the effects of judicious advertising will be the influencing of this latest and growing demand on the part of hundreds of millions of people in South America, Russia, China, Dutch East Indies, etc."—ERNEST B. FILSINGER.

"THERE is one axiom in export advertising that every beginner must learn, 'You cannot expect results in less than a year.' As a matter of fact, there is very little that can be accomplished in any line of export endeavor in a shorter period."—CARL HERKIMER GREENE.

Kind of Advertising to Be Used in Latin-America, China, Russia, and Orient

Opinions of Carl Herkimer Greene and Ernest B. Filsinger, at National Foreign Trade Council

NEVER before has the subject of advertising for foreign trade been given so much attention as at the Fifth Annual Foreign Trade Convention, held in Cincinnati.

The necessity for war advertising in order to retain the good-will of your merchandise on the foreign market is well emphasized in the present policy of English manufacturers who, despite their inability to deliver automobiles, motor trucks and many other articles, because of war demands, have continued their advertisements in South America, India and Australia. Ernest B. Filsinger, export manager of Lawrence & Co., New York, placed special attention on this commendable attitude of the British manufacturer.

The necessity of retaining good-will accumulated in former years is so essential that advertising must be continued even when shipments cannot be made. These British firms are unwilling to permit the names of their automobiles, trucks and other products to be forgotten during the present period of non-delivery. These firms will enjoy a decided advantage over other manufacturers who have not been so foresighted, when conditions again become normal.

Year Required for Results

Carl Herkimer Greene of the Federal Export Corp., New York, emphasized as the keynote of his talk on advertising in Latin-America the fact that you cannot expect results from advertising in foreign countries in less than a year, and that very little can be accomplished in any line of export endeavor in a shorter period. It makes no matter how well your advertising campaign is prepared you will not have tangible results until after the first twelve months. After this, business will be cumulative and will grow stronger and more profitable just as long as you feed it with the right kind of catalogs, circulars and follow-up matter.

Advertising for foreign trade is yet in its infancy. In fact, Mr. Filsinger described it as still an unknown quantity. There are a great many organizations now specializing on foreign trade advertising who have studied the mental attitude of the foreigner, which is one of the prime essentials in foreign advertising. Copy suitable for the United States may not in any way be suitable for use in any other countries; in fact, would appear ludicrous.

Advertising in foreign countries means much more than display advertisements in class journals, daily papers, export papers and general periodicals in the foreign countries. These must be supplemented by souvenirs, specialties, circulars and printed matter of certain kinds, particularly in those countries where there is not a surfeit of such printed matter as we have in the United States.

Must Be Adapted to Country

One of the prime essentials of export advertising is that it must be adapted to the viewpoint of the country for which it is intended. The design to make an effective sales appeal should be prepared with a thorough understanding of the state of mind of the person whom it is thought to influence. This is the case with business-paper advertising, newspaper advertising, and also with electric signs, posters, billboards and other methods of appeal.

In planning advertising campaigns for export trade, the per capita wealth of the foreign nations must not be considered in the light of to-day but rather in the light of 20 years hence. The buying power of people in many countries to-day may be low, but there will be an extraordinary change in 20 years, and judicious advertising will influence this latent and growing demand in the hundreds of millions of population in Latin-America, Russia, China and other places.

Mr. Greene said in part:

"Advertising to the whole world outside of our shores is one of the most powerful arms we have in defending our foreign trade. Advertising is particularly American. It is a medium that we know how to handle, and it will be a means of defense for the trade that we have won in the period of intense competition that is to come after the war.

"Advertising has already done much to build up Latin-American trade. There are hundreds of manufacturers in this country who are selling in large volumes abroad, and who have never had a salesman south of Key West. These manufacturers have made a success of advertising to Latin-American buyers, and have done so by their own efforts.

"Progressive advertising agencies are looking overseas now, and we can soon expect them to apply their methods of market investigations to Latin-American fields.

"An advertising campaign for Latin-America must include catalogs, dealer helps and a system of prompt correspondence. In your first year of advertising you will be studying the best forms of subsidiary advertising matter, for an advertising campaign to Latin-American markets is nothing if not susceptible to frequent change to meet the peculiar requirements of local conditions.

"When you go into Latin-American fields you go up against the keenest buyers on earth. These peoples have not been so thoroughly educated to advertising as we have, and you have an advantage. They will read a straightforward, plain story about the merits of an article without having it trimmed up, as is necessary in this country.

"Advertising to a Latin-American is not the commonplace it is to us, and for this reason: He gives an advertisement closer attention, and inversely is less impressed by smashing big spreads and stunts. Big space, used simply to overpower the reader, by its splendor and bulk, will turn him away in disgust.

Successful Ads Are Simple

"The most successful export advertisements for Latin-America have been written in a simple, informative style —something similar to those advertisements in old volumes of our magazines. Such advertisements tell more of what the product will do than of how it is made. The advertisement does not claim more for the goods than they will accomplish. There must be no spirit of superiority or condescension in them.

"The illustrations for Latin-American advertising should be actual photographs of your goods. Pictures are the universal language. Have big pictures of your products, and in different views. Humanize your products, just as you do your domestic advertising, by showing people using the goods, working them or wearing them. And if the goods are wood, metal or textile working machines, show some of the products they manufacture.

"Advertising will accomplish two things for you in Latin-America: It will help you to secure distributors or agents. It will aid those distributors or agents in selling to the customer.

"Advertising in the local newspapers and magazines in Latin-America will prove effective for goods that sell to the better classes. Brazil, Argentina, Chile and Uruguay have a number of excellent newspapers and several magazines that give good returns to advertisers. As these reach the consumer only and as he has no facilities for importing they cannot be used to much advantage by the American manufacturer who has no distribution established.

"There are very few such trade or technical papers in Latin-America as we have in every industry in this country; so that if an ultra-technical argument must be made, it will have to be presented by letter or circular. Your distributor can help you in the selection of mediums, but when it comes to placing your advertisement it will pay you to use one of the American advertising agencies that specializes in such foreign business. Latin-American rate cards are very elastic, and their agencies know far better than most local merchants what the bedrock prices are.

"If your product sells to the general trade, you must feature your trade-mark or something equally distinctive about the package of goods. The lower classes in Latin-America buy by the trade-mark, and most of these are nicknamed by the customers. For years Ivoroid paint, which bore an elephant's head as a trade-mark, was asked for by the lower class of people as "Elephant" until the export manager discovered it, and changed the name to correspond with the trade-mark."

Mr. Filsinger said in part:

"The great majority of business men are not yet sold to advertising in connection with foreign trade. In fact, American advertising in foreign papers for many years was almost exclusively confined to announcements of patent medicines. In late years advertisements of automobiles, talking machines, shoes and toilet preparations have made their appearance, but out of all proportions to their possibilities. If you glance through local papers, magazines, trade journals, etc., of almost any foreign country you are struck by the paucity of American names.

After-the-War Advertising

"After-the-war advertising for foreign business will play the part that the most powerful guns are now playing in physical warfare. Advertising of the right kind will prove equally effective in establishing American branded articles which, on account of the war, it has been impossible to export. Advertising properly planned and carried out will reduce the cost of entering and winning markets which heretofore have been closed to us.

"There are certain countries in which, after the war, American products, if properly pushed, can find particularly promising fields. These are, in their order: Latin-America, Russia, Latin-Europe—that is, France, Italy, Spain and Portugal (also the colonies of these countries), China, Dutch East Indies, British Colonies, Scandinavia.

"Every progressive business man reads from one to five class or trade journals, business papers, etc. The foreign buyer is in no wise different. Practically every important trade abroad has its own class journals. *Henceforth these will be used to an increasing degree by American business men who have manufactures or products which will appeal to the foreigner.* Unfortunately, most American manufacturers have hitherto confined their foreign advertising appropriation to American export journals. These papers have done and are doing a notable service in extending American export trade, and deserve the support of all far-sighted manufacturers. But this in itself is not sufficient.

It may be laid down as a general rule that other forms of advertising which have been found successful in the United States will prove equally so in foreign countries. Naturally, there are degrees of success abroad as at home.

"In the trade battle of the future the motion picture will have a very definite place. It will be especially employed for the education of people to the use of articles or processes. It will be employed to impress the foreign buyer, either merchant or individual, with the magnitude

(*Continued on page* 857)

Uniform Cost Accounting

Résumé of a Paper Presented at the Annual Meeting of the American Gear Manufacturers' Assn.

By J. H. Dunn

THE fact that various systems of cost finding, as applied to individual jobs, produce widely different results in the total cost figures obtained seems to prove that it is an advantage to an industry to establish uniformity in its accounting practices as well as standards in its product. The government has for some time encouraged uniform cost accounting for industries, and it is not impossible that a uniform system for industries of the same character may at some time be made compulsory. The secretary of the association recently issued a bulletin to the members in the form of a questionnaire regarding individual cost methods. The answers received to the questionnaire are summarized in the following.

Most concerns (80 per cent) prepare a monthly financial statement of assets and liabilities, earnings and expenses, while some (20 per cent) do not. When an order consists of several items, or of one unit consisting of several items, 60 per cent keep a record of the cost of each item, 20 per cent do not, while the other 20 per cent are guided by the conditions in each case.

As a basis for estimating costs in making quotations, all of the concerns use their previous experience and records of similar jobs. Actual costs and estimated costs are always compared. The majority use a time stamping clock in reporting the time and direct labor cost on each operation on a job. Practically all have a time report for each job.

Different Plans for Work

One-half of all the firms replying to the questionnaire have work done on the day work plan only, 40 per cent use both the day work and the piece work plan, and 10 per cent use only piece work. Practically all of the concerns, in figuring the material costs, use the actual or estimated costs, although several add a certain percentage to cover loss of material.

Overhead expenses are generally distributed among individual jobs on a percentage basis of direct labor. Some concerns, however, make the productive hours the basis, and other machine rates.

Shop expense accounts showing of what the total overhead expense consists are kept by 80 per cent of the members. In regard to depreciation, the practice is to base it on the probable life of the equipment and to include it in the costs as an overhead expense. Seventy per cent of those who replied set aside a reserve for depreciation and adjustment of inventories. In general the inventories come very close to book figures. Among the variations mentioned are 1, 4, 5, and 10 per cent.

Expense Charged as Overhead

Expense arising from defective workmanship and material is charged as overhead expense by 70 per cent and as direct costs by 30 per cent. Three-fourths of the firms replying keep accounts for different departments of their business, so as to show the results of each department. The same proportion follow the practice of combining the selling, administrative and general expenses with the shop overhead and distributing it as one total. The remainder figure the selling, administrative and general expenses for each order. In the distribution of the total overhead, 50 per cent figure on the basis of productive labor, 25 per cent on shop cost and 25 per cent on selling price.

All of the members replying are favorably inclined toward a uniform cost accounting system for gear manufacturers, but some of them point out that before they would make a change, they would have to be convinced of the advantages of the new system. As regards plans for arriving at a uniform cost accounting system, the general suggestion was that the matter be referred to a committee of members. The opinion appears to prevail, however, that before a uniform cost accounting can be of benefit a standard quotation form must be established, as well as standards for accuracy and finish of work.

The replies indicate that a very considerable difference in cost figures for the same job could be traced to different methods used in compiling the figures.

Many Different Items

An investigation of the various cost systems in use would, no doubt, develop quite a number of differences in the items that are considered as direct labor, productive material and expense. There are items of cost such as engineering time, inspection, setting up machines, boxing and packing, etc., that frequently are charged as overhead expense, that can be distributed to individual orders. Special patterns and tools manufactured or purchased for the production of an order that is not a standard product, and are not available for general use, are proper charges directly to the cost of the order and not to overhead expenses or capital account. In the reports received from members it appears that the practice predominates of compiling all overhead expenses, including commercial costs that have no connection with manufacturing, as one total and distributing same on a percentage basis of direct labor. It is certainly desirable that the shop and commercial costs be shown separately, and it is a question whether commercial costs should not be distributed on the basis of total shop cost, rather than on one component of shop cost, such as direct labor.

In a shop with but a few varieties of machines and a largely uniform production, the matter of distributing shop overhead to jobs with a reasonable degree of accuracy is far simpler than in plants doing largely a special business, with equipment units that have far greater differences in the cost of operation than the difference in the labor rates paid the workmen. Under such conditions the general percentage basis fails and overcharges the job on the less expensive machines to the advantage of the cost of the job on the machine that costs more to operate. Furthermore, in plants where there are automatic machines and it is not unusual for one workman to operate more than one machine, the amount of overhead expense charged against an order, figuring on a percentage of direct labor, can easily become merely a matter of circumstance, depending on how many machines a man is operating. The machine-hour plan for distribution of shop overhead expenses has some advantages, especially when applied to unusually expensive machines, in placing shop overhead burdens where they belong.

An important benefit would be gained by the industry if losses sustained in absurd competition based on lack of costs, or lack of uniformity in methods, rather than any difference in actual manufacturing costs, could be eliminated.

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THE capital invested in the gear industry as represented by the members of the gear manufacturers' association is approximately $21,000,000; the operatives employed number 18,500; the annual production is valued at $33,000,000.

Design of Automobile Glass Fronts

Objects of the Glass Front and How These Can Best Be Attained—Difficulties with Vertical Fronts and How They Are Eliminated by the Sloping Front

By Karl Feilcke

THERE can be no question that the glass front or windshield of a modern automobile, especially of an open car, contributes more to the comfort of the passengers than any other accessory; and that its efficiency as a protecting device has an important bearing on the value of the car to which it is attached. The design and installation of a glass front ought to receive for this reason the most careful consideration; yet an examination of some of the latest cars shows that such is not the case, and that in some instances even the fundamental principles involved are not understood. This is perhaps due to the fact that the data available on windshield design have never been gathered and put at the disposal of automobile engineers in the proper form, and it may not come amiss therefore if we attempt to do this here.

To accomplish our object in the simplest and best manner we will proceed as follows:

A. Define the functions which the glass front of an automobile should perform, and give a description of the technical means by which the performance of these functions is attained.

B. Describe and criticize the glass fronts used on motor cars of the latest type, and point out the remedies for the defects found in detail construction and general arrangement.

C. Draw a few conclusions as to the further development likely to take place in this particular field of automobile engineering.

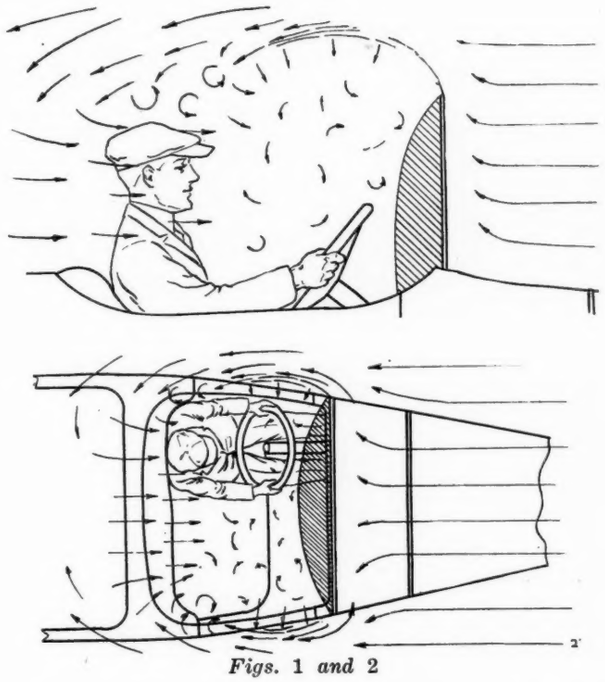
A. The Functions of a Glass Front and the Technical Means by Which the Performance of These Functions Is Attained

The glass front of a modern automobile consists of a number of glass plates arranged in front of the driver in order to protect him and the other passengers against the discomforts caused by the movement of the car, possibly in conjunction with the weather or road conditions. By these discomforts are understood draft, cold, dust, rain, snow and insects.

The glass plates alone, of course, cannot afford sufficient protection to the passengers, but have to be supplemented by the body, sides and roof on a closed car, and by the body, side curtains and folding top on an open car. A concise definition of the functions of a glass front is therefore:

To insure in co-operation with the body, sides and roof on a closed car, or with the body, side curtains and folding top on an open car, under all possible weather, road and driving conditions the maximum comfort to the occupants of the car.

By proper co-operation with the above-mentioned parts of the car is meant that the glass front must furnish a secure anchorage for the front end of the folding top or the roof and make whenever required a practically air and watertight connection with the roof, sides, folding top, side curtains and body.



Figs. 1 *and* 2

The definition given here applies to glass fronts for both open and closed cars. We will consider, however, mainly the more universal case of the open car and make reference to the closed car only when the necessity arises; for the stationary roof and sides of the latter simplify the problem to such an extent that the closed car becomes only a special case of the open car with the folding top up and the side curtains in place.

As the cowl shield does not sufficiently protect the passengers on the rear seat of an open car when the top is folded down, special tonneau shields have been used of late on some cars. We will deal with such shields in a later paragraph and restrict our analysis for the time being to cowl shields only.

The technical means used to insure the performance of the functions outlined above consist in giving the glass plates different positions relative to the body and passengers according to the varying weather, road and driving conditions. These positions have been developed by experience and are as follows:

1.—*The Upright Position.*—The glass plate is in an upright position as shown in Figs. 1 and 2, and when moved forward by the car banks up the air and creates a comparatively windstill low pressure space back of it, which protects the passengers seated behind the shield against some of the discomforts mentioned above.

The characteristics of this low pressure space vary with the speed of the car, the size of the glass front and wind conditions in general, but whenever the car is in

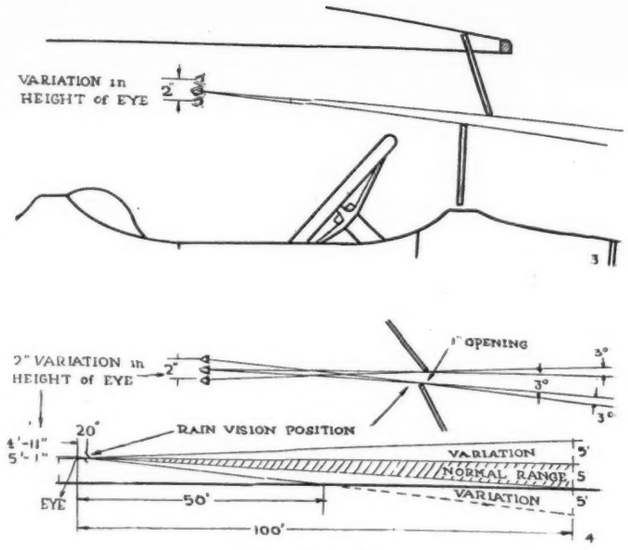
motion the space back of the shield can roughly be divided into three distinct zones. Directly back of the glass plate and measuring only a few inches in depth is the quiet zone, where no air currents are perceptible; then comes the eddy zone, which extends considerably farther back, and finally the back draft zone. The eddies and back drafts are caused by the tendency of the air to fill up the low pressure space and increase in intensity in proportion to the distance from the glass as indicated by the size of the arrows in Fig. 1. The protection of the passengers is, of course, the better the more they are seated within the comparatively quiet eddy zone.

The upright glass plate affords protection against wind, insects, dust and the rush of the air caused by the movement of the car, and in conjunction with the body cowl, side curtains and folding top also protection against rain and snow. It insures, therefore, the performance of most of the functions demanded by our definition, but brings with it, unfortunately, two new disadvantages; first, the impairment of vision owing to the glass being covered at times with rain drops, ice, snow or mist, and, second, stuffiness in the front compartment due to the shutting off of all air currents through the upright glass plate and the body cowl. Several additional positions of the glass plate have been found necessary to overcome these defects—the clear vision position to correct the former and the ventilating position to correct the latter.

2.—*The Clear Vision Position.*—This position is attained by dividing the glass plate horizontally and tilting the resulting upper plate ahead as shown in Fig. 3. The slot thus created between the two plates is so located that the driver in his normal attitude can overlook a stretch of the road in the proper distance ahead of the car without looking through either glass, but is made so small that rain or snow cannot annoy him to any great extent.

How small this slot can be made and yet give a sufficient field of vision is shown by Fig. 4, which represents the conditions existing on a well-known car. The eyes of the driver are 60 in. above the ground and 20 in. away from the slot. As the driver can raise and lower his head without effort so that his eyes cover a distance of 2 in., a slot only 1 in. wide, measured in a perpendicular plane, when properly located with reference to the driver's eyes gives an ample field of vision, as shown by a close study of Fig. 4. Experiments made with paper-covered windshield plates have shown that it is possible to drive a car with a clear vision slot only ½ in. wide safely through dense traffic, but for average conditions it is not advisable to figure on less than 1 in., as the strain on the driver becomes greater the smaller the slot.

Owing to the opening between the glass plates the clear vision position does not afford quite as good protection against wind, dust and cold air currents as the



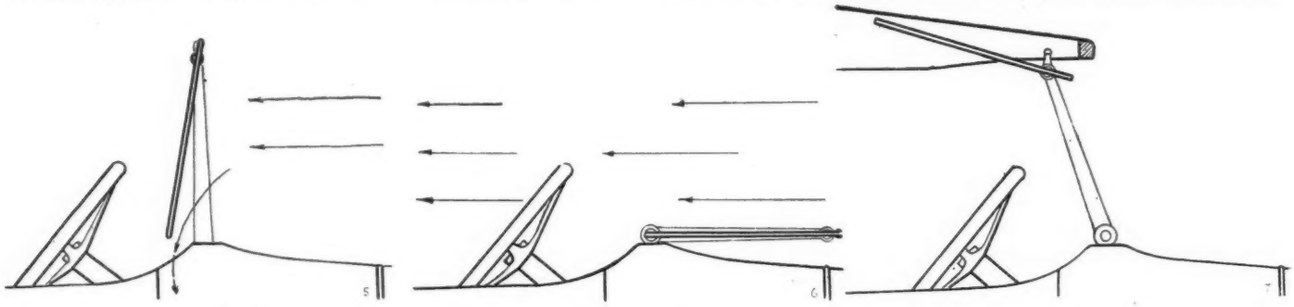
Figs. 3 and 4

plain upright one, but if we take into consideration that the air coming through the slot is naturally diverted over the driver's head, as indicated by the arrow on Fig. 3, we see the reason why it is not very objectionable as long as the slot is small. On closed cars this air current is hardly noticeable, for as much air as comes through the slot has to escape from the body, and if the doors and windows are fitted tight the air circulation through the clear vision slot is very much slowed up on that account.

The clear vision feature makes it possible to drive a car with safety on moist, frosty and snowy days, and also on rainy nights through illuminated city streets. For in the latter case the reflections of every light in hundreds of rain drops on the glass plates would blur the driver's vision and confuse him were he compelled to look through the glass. The clear vision position is of special importance on closed cars, first, because they are mostly in service during inclement weather, and then because the higher temperature inside the car, especially when the latter is heated or has been kept in a warm garage, causes a quick frosting of the glass plates.

3.—*The Ventilating Position.*—The long cowls used on modern cars, while bringing the glass front close to the driver and giving ample protection during cold weather, create a dead air pocket in the front compartment, which becomes uncomfortably hot during the summer months owing to the nearness of the engine and exhaust pipe. This is especially the case when, on account of the scorching sun or dust conditions, it becomes necessary to drive with the top and glass front up.

To remedy this defect the glass plate is tilted backward in such a manner that a gap is created between



Figs. 5, 6 and 7

the lower edge of the glass and the body cowl. Some of the air striking the glass is then deflected downward through this gap into the body front compartment, causing a constant change of air in the latter and thus ventilating and cooling the feet of the driver and front seat passenger (see Fig. 5). In addition to relieving the stuffiness behind the shield this ventilating position gives about the same protection against wind, dust and insects as the upright one, and is on that account very popular during the summer months.

4.—*The Open Positions.*—While the ventilating position cools the front compartment of the car without sacrificing the protective features of the upright position, the same object is accomplished in the different open positions by folding the glass plates out of the way and eliminating them for all practical purposes.

How the different open positions are attained depends, of course, on the construction of the shield and whether the folding top has to be supported by the glass front or not. If the top is folded down the easiest way to attain the open position is by folding the glass plates completely out of the way, as shown in Fig. 6. If the open position is wanted with the top up, and that is frequently the case in summer time when plenty of ventilation is needed and at the same time protection against the sun, it can be attained with a one-piece shield, as shown in Fig. 7.

(*To be continued*)

Foreign Trade Advertising

(*Continued from page* 853)

of an industry, its effectiveness, management, etc. It will be used to illustrate points in a selling campaign, which could in no other way be shown. Salesmen in foreign countries especially will be equipped with films suitable for this purpose.

"In planning for foreign advertising, specialists should be consulted to the same extent as they are brought into conference on advertising in the United States. Fortunately there is a growing number of such specialists in this country. In addition, there are exceedingly clever and reliable agents familiar with the situation in practically every important foreign capital. Paris, London, Buenos Aires, Madrid, Cape Town, Sydney, etc., all possess agencies in a position to help solve the problems of American manufacturers. The names and addresses of such agencies are easily obtainable from the Bureau of Foreign and Domestic Commerce.

"In the development of our future export business, the local newspaper will perhaps be the most important medium at our command. Russia with its 180,000,000 of people offers, in many lines of manufactures, unparalleled opportunities. American advertisements must appear in the pages of the great Russian newspapers, alongside of English, French, German and other houses. In France, the daily newspaper is even far more influential than in the United States. Papers like *Le Petit Parisien* (circulation 2,250,000), *Le Matin* (circulation 2,000,000) and *Le Petit Journal* (circulation 1,250,000) offer opportunities to reach not only the great French market, but the numerous and important French Colonies.

"Incidentally, these colonies, which heretofore have largely depended upon France for their supplies, will, in a much larger degree than ever before, turn to the United States. In South America there are papers like *La Nación* and *La Prensa* of Buenos Aires, and the *Jornal do Commercio* of Rio de Janeiro, which are all powerful. England has many papers reaching numerous foreign markets which offer attractive channels for American effort. The Dutch East Indies, Scandinavia, Australia, India, etc., have numerous newspapers equally important. To mention even a reasonable number of the most important would require a considerable amount of space.

"The United States Government must be the heaviest advertiser of all. The value of publicity in its behalf has been over and over proven within the last twelve months. This country no longer occupies an isolated position, but it is a part of the great world of affairs. If we seek to hold the place which we rightly deserve, our aims, ideals and purposes must be fully and continuously set forth to all alike. The best medium of publicity for the United States, as for the individual manufacturer, is the newspaper. This will have to be freely employed. Propaganda as such is indefensible, but there are many indirect methods by which it can be carried on, such as special features, stories, etc. Another means available is the cinematograph, or moving picture. We can well take an example from the English Government, which has arranged for an adequate exhibition of its industries through this means. Trade journals, magazines, etc., must likewise be used. A thoroughly developed plan to be carried into effect by our corps of salesmen abroad could easily be evolved. By salesmen I refer not only to the traveling agents of American houses, but I mean our consular force, diplomatic agents, special investigators and representative Americans everywhere.

"One of the inevitable results of the war, and one highly desirable, will be a closer co-operation between the government and business men. Among the ways in which this will find practical expression will be advice through our Bureau of Foreign and Domestic Commerce on the best means of advertising in the different countries, the most effective mediums, and the papers which should not be patronized because of their unfriendly attitude to this country. Attached to the Bureau of Foreign and Domestic Commerce there should be a Department of Foreign Advertising, in a position to advise American manufacturers on their problems of publicity. Such a bureau should accumulate data on every phase of the advertising situation and place it at the disposal of all American manufacturers. The establishment of such a bureau would be akin to the creation of a Far Eastern department, a Latin-American department, a European department, etc. Obviously, as an official body it would be able to obtain data not accessible to the ordinary individual, since it would have at its command the diplomatic and consular service, special agents and investigators, etc. If properly directed, its services would be tremendously important, therefore the man best fitted for the work should be selected and an adequate salary arranged for. In case that an economic war became a necessity a department of advertising would be absolutely indispensable."

THE American Brass Co., Waterbury Brass Branch, Waterbury, Conn., has issued a booklet containing information covering the different meshes, alloys and melting points of brass spelter solder for hard brazing. The company has been in this business for twenty-five years, having manufactured brass spelter and solder in cores and round grains, in several mesh and lump forms.

Proper Balance Between Commercial and War Work Not Yet Struck

The Present a Period of Change-Over—Lack of Transportation Facilities Acts as Throttle on Industrial Expansion

By J. Edward Schipper

THERE is a country-wide uncertainty and lack of knowledge regarding conditions in the manufacturing and industrial districts. This is not only true of the automotive industries, but applies with equal force to all industries wherein the raw material, the labor, or the factory equipment is similar to that demanded by the present activities of the government. It is known in a vague sort of way that commercial conditions are upset, that production is curtailed, and that materials have been diverted from their normal course into channels of a more war-like nature. This upheaval, coming suddenly, has brought a period of readjustment in its wake, and we are now well into this period. The very nature of war is such that settled conditions can hardly be looked for while the war lasts.

We have not as yet readjusted ourselves sufficiently to be able to classify business of a commercial nature and business of a war nature according to their relative importance, and therefore cannot gain a clear insight into the inter-relationship of the two. In the automotive field this is particularly true, because the material, the labor and the factory equipment are all of such a nature that they are of great use to the government at this time.

Conditions Upset

It is not difficult to see why conditions in the automobile business were upset on the entrance of this country into the war. The declaration of war created instantly an insatiable appetite for munitions. The automobile industry, developed to a high state of efficiency, and with a superb organization of the very nature best adapted for munition manufacture, was as a ripe plum to be seized upon, with the natural result that for the time being the importance of preserving the automobile industry as a commercial institution as well as a war institution was forgotten. It was quite natural that the curtailment idea should have been brought forward, and it is now a matter of congratulation that the curtailment which has been decided on is no more than would have normally taken place had the idea never entered the minds of government officials.

Nevertheless, there has been a great transfer of factory activities from commercial production to war work, with the result that passenger car production this year will be less than 50 per cent of what it would have been under normal conditions. This loss of 50 per cent on private business has been made up by war work. The factories are busy—busier than they have ever been in their existence. Every available machine is utilized, first to turn out what the government demands, and after that to supply the wants of distributors throughout the country. These distributors are not benefited by war work, but their livelihood depends upon having a product to sell, and with even the greatest demands of war work, it would be shortsighted to deprive some of the country's ablest business men of their means of livelihood.

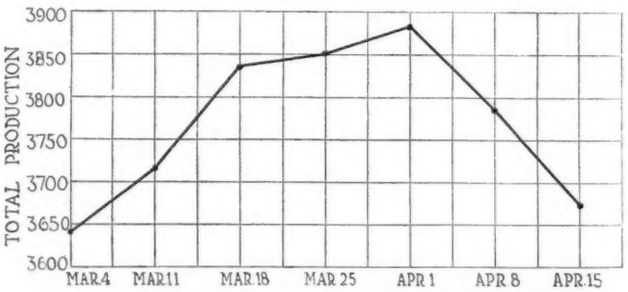
If the money raised by taxes, Liberty Bonds, Thrift Stamps, War Savings Certificates, Red Cross donations, etc., among the different industries could be determined and a comparison made on the basis of either capitalization or output value, it would be seen that the automotive industries carried a notable share of the cost of war to date, and the money they have contributed has come, not from the factories alone, but from the vast distributing organizations of this billion dollar-a-year industry.

A little thought will make obvious the necessity of maintaining this great national asset—the distributing organizations—and we will therefore dismiss this phase of the matter and look into conditions in the manufacturing centers. The factories are the hearts of the big distributing systems and the operation of their machinery is the heart action which sends the blood of sustenance to thousands upon thousands of families throughout the country.

As we look into these factories we find that, as a rule, they have taken on war work to the limit of their ability, or to the full extent of demands made upon them by government departments. It is estimated that in Detroit there will be $700,000,000 worth of war products turned out during the year 1918.

Real production on this war work is only starting. New and more suitable plants have sprung up like mushrooms to take care of the work. Old plants have been reorganized so that they can take care of government orders and at the same time maintain their established commercial business. The tooling-up stage is now practically over and production is just about to start. A marked change will be noticeable after July 1.

It is hardly necessary or advisable to give an outline of what the various companies are doing, but it is well



This production curve shows the output of twenty-three of the largest passenger car manufacturers in Michigan and Ohio, over a period of 6 weeks. It will be noted that we are at the present time in a period of production depression, largely due to transportation conditions, both of incoming material and outgoing finished products

known that Ford, for instance, besides making cylinders for Liberty airplane engines, is now building submarine chasers for the Navy, is working on two-man tanks, will make the complete Liberty engine and is even reported to be experimenting on rifle manufacture.

Dodge Brothers have turned their attention to all sorts of war work, even to the extent of putting up an arsenal. Almost immediately after war was declared they took contracts for parts for artillery equipment, such as recoil springs.

From the plant of the Packard Motor Car Co. a train of new Packard military trucks, numbering between thirty and thirty-five, starts every morning. These trucks, loaded with military stores of all sorts, travel under their own power over the roads between Detroit and Baltimore, where most of them are shipped direct to the expeditionary forces under General Pershing. Besides this, Packard was first to get into production on the Liberty airplane engine, and from an output of five a day is now increasing materially, so that while it is impossible to give definite figures, many times this number daily will be coming through by June 1.

The Cadillac Motor Car Co. will soon be turning out complete Liberty engines and is already making important parts for assembly in other plants. Buick is sharing the work with Cadillac on a substantial order for Liberty engines, and also has long since been in production on important parts of the engine.

The accomplishment of the Fisher Body Co. in erecting a plant of its own design so that one-quarter of it, a unit of 2½ acres, was completed and ready for the production on training planes in 60 days, has established a record which is hard to surpass in work of this kind. In a short time the second quarter of the unit will be completed and battle planes which are now so sorely needed will be produced on a substantial scale.

Few Factories Not on War Work

There is not an automobile factory or parts factory which has not turned over a big percentage of its plant to war work. In some cases the Government has actually stepped in and taken machinery from the floors. So the end of the first war year finds factories which were already in existence before the war in full swing on Government production, and factories which were not thought of a year ago also in actual production.

It is only necessary to mention the Chalkis Co., formed by two officials of the old Chalmers Motor Co., which is in big production on rifles; and the Lincoln Motors Co., formed by Henry Leland and his son immediately after their resignation from the Cadillac company, who have constructed a plant unsurpassed in modern equipment, which will also soon be in production on airplane engines on a large scale. Neither of these plants was thought of before we entered the war. The concerns named are only a few of the many which are doing invaluable work in war production at the present time.

The necessity of maintaining the good will of the automobile industry, and at the same time using to the greatest possible extent its productive ability for war work, has created a situation which must be handled with the greatest care. At this very moment the officials of industrial concerns throughout the manufacturing districts of Michigan are confronted with serious problems pertaining to labor, transportation facilities, material, machinery and tools, in respect to each of which items there is a shortage.

Detroit at present is short approximately 20,000 men, and when the large new plants, such as Lincoln Motors, Ford Shipbuilding, Fisher Body and many others, get into production, this number will be raised to over 30,000. To meet this situation the labor dilution method has already been put into effect. It has been found possible to take farm boys and put them at machine operations of a specific character and soon make them satisfactory at the particular job. We cannot, however, take the young men from the farms at this time. The use of women for light machine operations is growing rapidly, and in nearly all plants has been a sufficient success to relieve a situation which otherwise might have been acute. It is intended to encourage the importation into this district of a large number of negroes from the South, which will further tend to relieve the situation. To offset this improvement, the most skilled men from the territory have been drawn into Government service.

Government Taking Skilled Factory Help

It is customary to have an officer of the army or navy come into Detroit and open an office for two or three weeks, and go away with 300 or 400 of the most skilled men he can find. It matters not whether these men were on munition work or not. The men are asked whether or not they want to go, and their employers are not consulted nor is their employment closely looked into, except in so far as it qualifies the men for the particular job for which the Army or Navy wants them. It is not going too far to state that in many instances the men would have been more valuable to the Army or Navy in their factory positions than they were in their enlisted capacity. The chief metallurgist of a large automobile concern now in shell and airplane work was drafted. The first draft hit many other organizations in a tender spot, as far as skilled men were concerned. These men are now in the cantonments as privates, where their value to the country is only a small fraction of what it would have been had they remained at their machines.

The reason for this is simply that in levying under the first draft, industrial occupations were recognized as ground for exemption only on the basis of production at that time. The fact that real Government production had not yet begun was not taken into consideration. It did not occur to the men administering the draft, except in rare instances, that workers on commercial products might shortly be turned over to Government work.

The result is a decided shortage of skilled tool makers, die sinkers, tool designers and the highest classes of mechanically skilled men. It takes ten times as long to train a tool maker as it does a lieutenant or captain of the line, based on present conditions, yet men of this nature are serving as privates in cantonments and will be in the trenches before many weeks.

Should Be Returned to Their Machines

The remedy for this is to immediately get these men back to their machines, where they are needed. It is, of course, recognized that behind the lines of the fighting army there must be another army of skilled men to handle the mechanical transport, the repair and maintenance work on airplanes, ordnance and all sorts of military equipment. These men are essential in the highest degree and should be in the highest degree skilled.

The burden of transportation is being lightened by the use of the roads, lakes, channels and rivers of the country, but it is doubtful whether even now the value of certain trunk roads is fully realized by Government officials.

To cite a specific example, the well-known Detroit-Toledo road may be mentioned again. The State of Michigan has just taken this road under its direct supervision and promises quick action on construction. In

(*Continued on page* 867)

Continental Model 9N Engine

Succeeds Model 7N—Has Heavier Crankshaft Which Is Very Carefully Balanced—Hot Spot Manifold

THE Continental Motors Corp. has brought out the 9N engine to succeed the 7N, and cars equipped with the new model engine are now being supplied regularly.

The 9N is similar to the 7N but incorporates certain refinements such as longer pistons, a hotspot intake manifold and a heavier crankshaft. The new manifold is so arranged that a portion of the intake is integral with the exhaust, thus giving the hotspot feature which has been found to be beneficial in shortening the warming up period with present day fuel. It also aids in the evaporation of the heavier particles of the fuel, since it carries the intake temperature to a sufficient degree to boil off the heavier constituents.

As in the 7N the inlet passes between the cylinders, which tends to keep the mixture in the gaseous state, and more heat is imparted to the mixture in the inlet passage by its contact with the thin wall of the exhaust manifold. The crankshaft is heavier, particularly as regards the crankpin. The pins are now 2¼ in., whereas they were 2 in. on the former model. To compensate for this the cheeks of the cranks are also heavier.

The Continental 9N six has a displacement of 303.06 cu. in. and was designed to meet the demands for an engine of medium power output and particularly adapted to the needs of the assembled car makers, being standard in every respect as regards accessories and clutch and transmission attachments.

The six cylinders are cast in block from reverberatory air furnace iron, which is rough bored and aged before the finishing machine work is carried out on it. Cylinder manufacture includes a finish-bore and grinding to standard size. The water jacket head is cast separately and is retained by screws, which gives a simpler casting and permits of greater uniformity in the cylinder core and tends to a very small percentage of loss in production.

The crank case and oil pan are separate, the crank case being an aluminum casting, and the oil pan pressed steel. The bearings are all carried in the crank case and can be reached by dropping the oil pan.

The valves are actuated in accordance with standard L-head practice. They are all of the same size and enclosed. The valves have nickel steel heads electrically welded to carbon steel stems. The heads and stems are ground to size and the clearance around the valves is ample to secure the desired efficiency. The ends of the valve stems are hardened to reduce wear against tappet action and the valves are fitted with oil tempered springs.

The valve stem locking device used on this engine is similar to that on the other Continentals, being a patent design and readily detached. The removable metal plates which cover the valves are also quickly detached and act as a dust-proof housing, as well as a means of keeping the engine quiet.

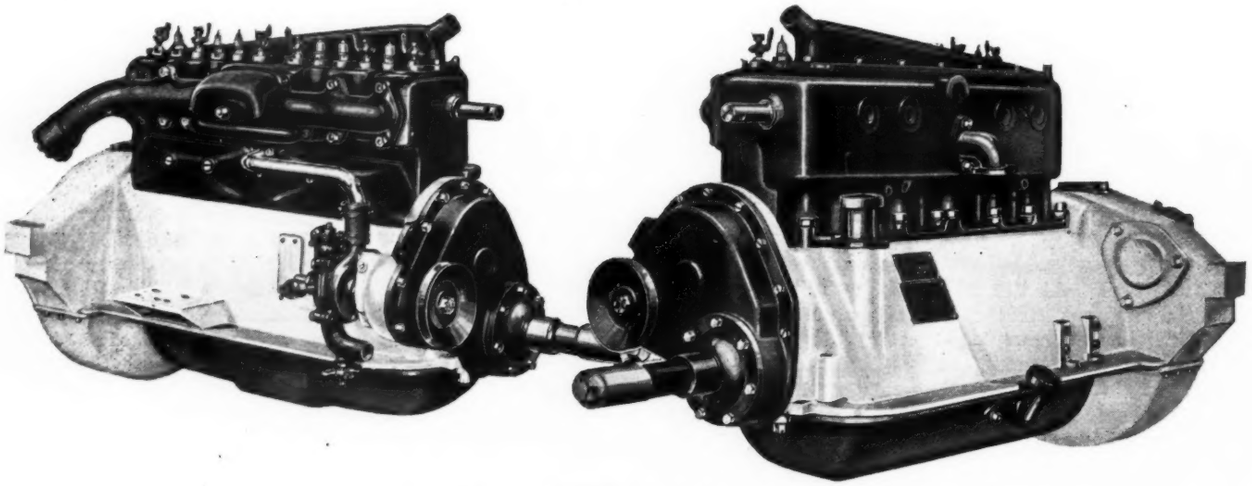
The pistons are made from the same grade of iron as used in the cylinders. They are ground to size and fitted with three diagonally split concentric expansion rings. These rings are ground on both face and sides. The rings are fitted in the piston grooves and are run into the cylinder by a belting-in process before the engine is run under its own power.

Oil grooves are turned on the outside of the piston for collecting and distributing the oil splash. As is customary, the pistons are weighed and balanced so that the piston sets entering each engine correspond in weight.

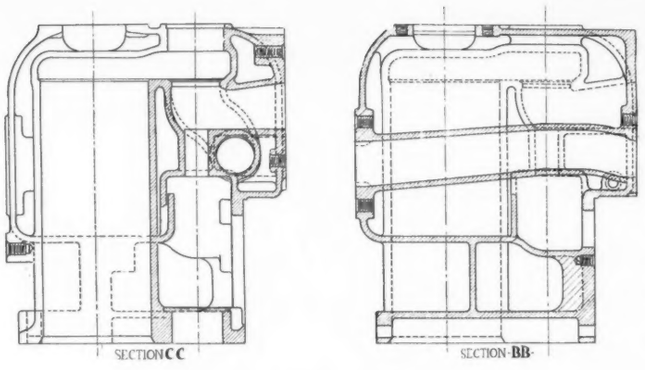
The piston-pin is made of No. 3 annealed steel tubing, hardened and ground to size. It is held stationary in the piston bosses by means of a locking device, and has its bearing in a bronze bushing which is pressed into the connecting rod. Lubrication of this bearing is obtained through an opening in the upper end of the connecting rod in which oil from the splash is trapped.

The connecting rods are of I-beam construction and are made of 0.35 carbon steel, drop-forged and heat-treated. Connecting rod caps are held in place by nickel steel bolts, secured by a locking device.

The camshaft is drop-forged from low carbon steel, the cams being integral with the shaft. This shaft is carried in white bronze bearings which are lubricated by oil that is forced to them by the oil pump, as will be afterward explained. The cam shaft is heat treated after the rough machining and annealing processes. The shaft is heat treated all through and is finish-ground to accurate size on a cam grinding machine. One of the points regarding the maintenance of this Continental engine is the fact that the camshaft may be readily withdrawn by removing the gear case cover. The camshaft acts directly on mushroom type



Two views of the new Continental 9 N passenger car engine



Cross-sectional views of cylinder block

followers, with heads and stems that are ground to exact size.

One of the differences between this engine and the 7N is in the more careful balancing of the crankshaft, due to new methods by means of which the crankshaft revolves at high speed by an air blast. This air blast is directed against paddles attached to the shaft on a collar, thereby relieving the shaft of any complications due to a driving mechanism which would be necessary to rotate the shaft in balancing it. The material for the shaft has a tensile strength of 80,000 lb. per sq. in. It is a drop-forged unit, heat treated, with flanges on both ends to take end thrust which may be imparted from the clutch or from any other outside mechanism.

The timing gears are helically cut on automatic hobbing machines. In order to secure the desired quietness, the center distances are held within close limits. Three gears of the timing gear chain are a crankshaft gear, camshaft, and a pump shaft gear. These timing gears are housed in the usual case on the front of the motor.

The bearing work is such that the maintenance is a thoroughly simple proposition. Crank, cam and connecting rod bearings are of nickel babbitt. Connecting rod and crankshaft bearings are backed with bronze, which, being a good conductor, aids materially in keeping the bearings cool. These are held in place by brass retaining screws. All of the bearings, after being fitted, are expanded on special arbors, reamed and finished with a slow-running spiral-cut power burnisher, which is claimed to give 98 per cent of actual bearing surface. The connecting rod bearing adjustment is secured in the usual manner by removing one or more of a number of punched steel shims varying in thickness.

The flywheel is attached to the crankshaft on the drop forged flange and is held in place by six steel bolts. It is made of iron, carefully turned and balanced.

Water circulation is by means of a centrifugal pump, fitted on the engine and provided with two large bearings fitted with stuffing boxes and equipped with a drain cock to draw off the water in freezing weather.

Lubrication is by a force feed and splash system in which circulation is maintained by a horizontal plunger pump driven by an eccentric from the camshaft. This forces oil through copper tubes direct to the timing gears and all main crank and camshaft bearings. The oil then drains back into the oilpan, thus maintaining a proper level for the splash lubrication of pistons, piston pins and connecting rods.

In fitting the clutch and gear set, either a cone, multiple disc or plate clutch may be used. Clutch and transmission units specially designed for installation on this engine are manufactured by practically all transmission manufacturers. This equipment is not furnished by the Continental company.

The Continental company furnishes with every engine, unless otherwise specified, water fittings complete, adjustable fan bracket, fan pulley for V belt, and port plug wrench. Provision is also made for the application of a power tire pump.

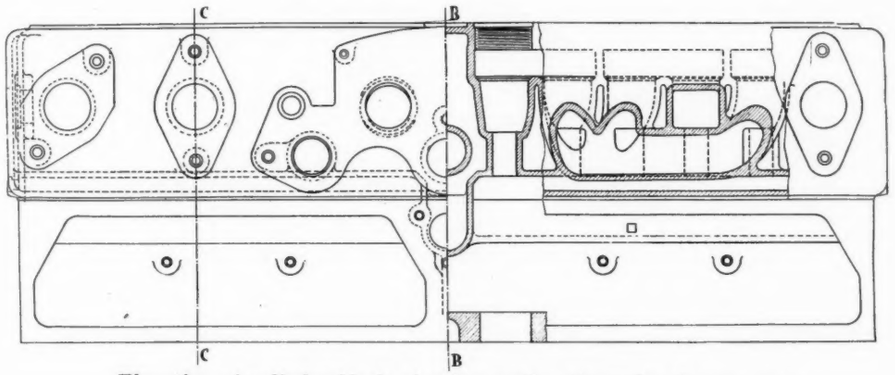
Any make of starting, lighting and ignition equipment can be used on the Continental 9N engine. This equipment is not included in the Continental quotation.

A table of specifications of the Continental 9N engine follows:

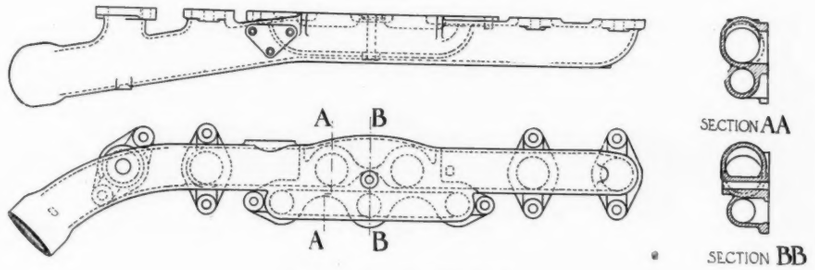
Type	six cylinder vertical—L-head
Size	3½ in. (88.9 mm.) bore by 5¼ in. (133.4 mm.) stroke
Displacement	303.06 cu. in. (4967.15 cu. cm.)
Horse-Power	S. A. E. rating 29.4—B. H. P. at 1000 R.P.M. 31, at 2000 R.P.M. 55.
Weight	600 lb. with standard equipment
Cooling	Centrifugal pump
Lubrication	Combination pressure feed and splash
Carbureter	Side outlet type, 1¼ in. (31.75 mm.) S. A. E. standard vertical outlet type can be used.
Ignition	Magneto or battery
Lighting Generator	Any standard make
Electric Starter	Any standard make
Clutch	Multiple disc or 10 in. plate
Transmission	Any standard make, having semi-No. 3 S. A. E. bolting flange.
Type	For unit power plant construction only
Suspension	Can be mounted either 3 or 4 points

Model 9N Dimensions Follow:

	Inches	Millimeters
Camshaft diameter	1¼	32
Camshaft bearing, front	2-19/64x1-11/16	58x43
Camshaft bearing, center	2¼x1-1/8	57x29
Camshaft bearing, rear	2-13/64x1¾	56x44
Connecting rod, length	10¼	260
Connecting rod bearing	2-3/8x1-13/16	60x46
Crankshaft bearing, front	2-25/64x3¾	60x70
Crankshaft bearing, center	2-11/32x2¼	60x57
Crankshaft bearing, rear	2-19/64x3-5/32	58x80
Piston length	4½	114
Piston pin bearing	1-5/32x1½	29x38
Piston rings, 3 in number, width	3/16	5
Valve diameter	1-11/16	43
Valve stem diameter	3/8	10
Rear supporting arm, drop	2½	64
Rear supporting arm width between machined surfaces	23-1/8	587



Elevation of cylinder block, showing section through valve passages



Hotspot manifold design

Remy System Combines Governor with Generator

Adapted Particularly to Tractor Use—Governor Can Be Adjusted to Suit Characteristics of Load

THE Remy Electric Co. of Anderson, Ind., has brought out a starting and lighting system for the Moline Plow Co.'s tractors, in which the generator acts also as an engine governor. In view of the necessity of getting work done quickly at certain seasons of the year, night work is necessary. The starting and lighting system is intended to permit night operation of the tractor, as well as to provide for the likely contingency of tractors being operated by women and youths who would not be physically able to perform the arduous labor of cranking the engine.

The Remy company believes that, since it is necessary to employ a generator, this generator may well be used for governing the engine speed, especially because it can be so arranged as to provide settings for the various kinds of work and the various loads found in farm practice. The principle on which the governor acts may be explained as follows:

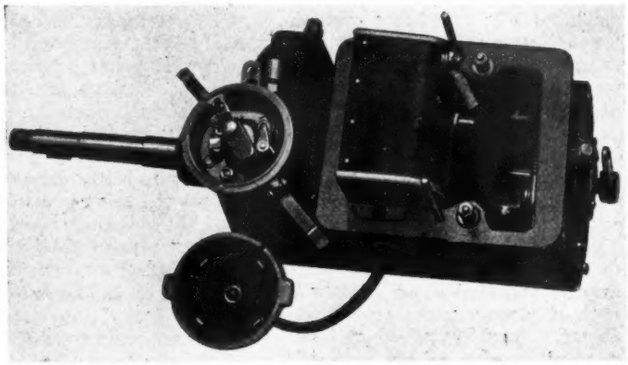
Any rotating apparatus which absorbs power must have at least two members, one rotating, the other stationary, and the absorption of power is due to reaction between these two. In order that the apparatus may absorb power, it is necessary by some means to resist a turning action on the stationary member. This resistance to turning action may be provided either by rigidly supporting the stationary member, or by opposing its rotative tendency by some flexible means such as a spring.

An electric generator is an apparatus which absorbs mechanical energy and changes a large proportion of it into electrical energy. The two essential members of an electric generator are the rotating part—the armature—and the stationary part—the field. The reaction between the rotating armature and the stationary field is due to the magnetism of the field and the current in the armature coils. At a given armature speed the tendency to turn on the part of the stationary field depends entirely upon the amount of mechanical energy absorbed, which in turn depends upon the amount of electrical energy produced. Therefore, by varying the amount of electrical energy produced we can vary either the resistance to turning or the speed at which this resistance will be realized.

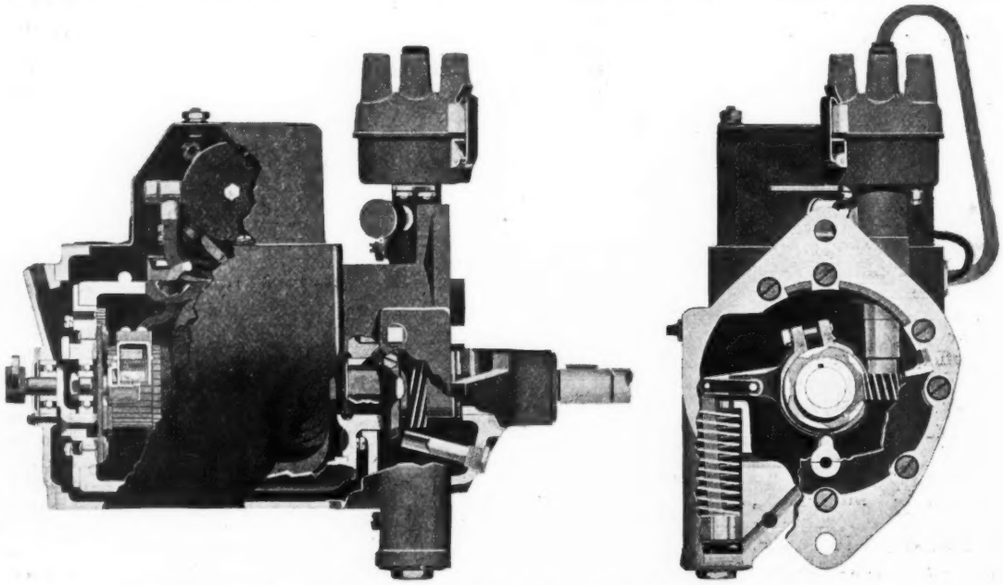
Governor Principle

In the Moline plow equipment this principle is utilized by having the stationary or field magnet member rotatably supported, and the tendency to rotation resisted by a spring of predetermined pressure. The field magnet remains in its normal position until the speed of rotation has become such that the amount of magnetism in that field, interacting with the armature ampere-turns, creates a rotative tendency sufficient to overcome the pressure of the spring, and then the field magnet starts to rotate in the same direction as the armature. This frame is so connected to the carbureter throttle that any angular motion in the same direction as the armature closes the throttle and thereby decreases the amount of power which the engine can produce.

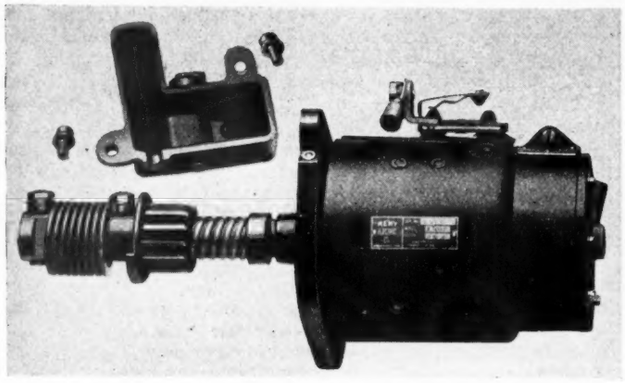
If a different engine speed is desired, it is necessary to change the magnetic strength of the field, and this is done by inserting resistance in the field circuit or cutting it out. With increased resistance in the field circuit the magnetic strength of the field at a given armature speed is less, so that the spring will cause a retrograde movement of the field magnet, thereby admitting more fuel to the engine and in-



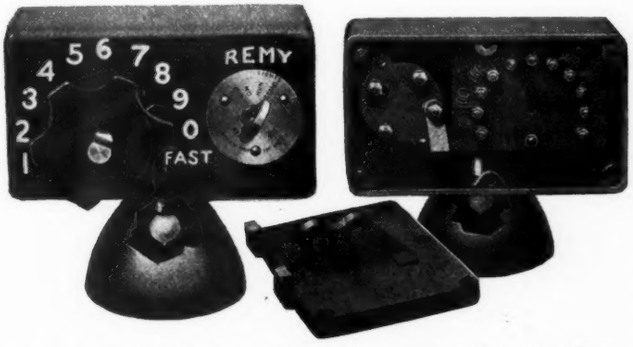
Remy generator and ignition unit designed for tractor use



Cut-away view showing construction of Remy ignition and generator unit particularly adapted to tractors



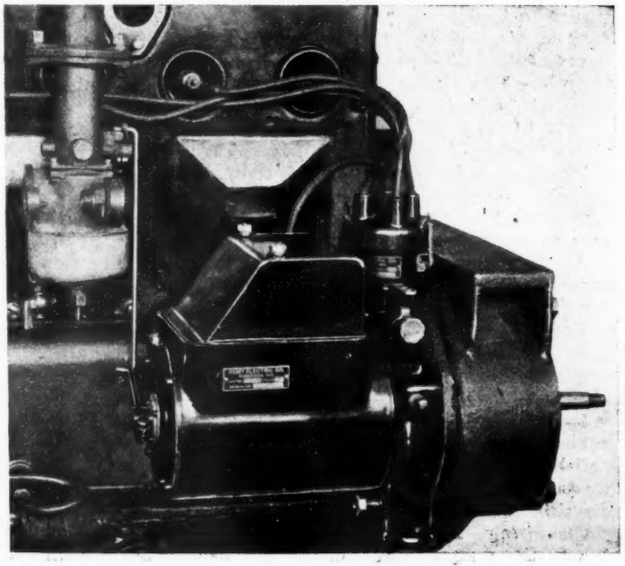
Remy starting motor for tractor installation, with starting switch cover removed



Remy tractor lighting and ignition switch with control box. Left—Front view. Right—Rear view, with cover removed

creasing its speed. On the other hand, with reduced resistance in the field circuit the field will be stronger at a given armature speed and close the throttle against the force of the spring.

This increase or decrease in resistance in the field circuit is accomplished by an adjustable rheostat. Rheostat and generator are of such dimensions that with the rheostat resistance entirely eliminated from the field circuit the spring pressure will be balanced by the field rotative tendency at about 500 r.p.m. of the engine and with all of the resistance



Remy ignition switch and control unit mounted on tractor in accessible position

of the adjustable rheostat included in the field circuit the pressure of the spring will balance the rotative tendency of the field magnet at about 1500 r.p.m.

Generator Shunt-Wound

The generator is a simple shunt-wound type. A ⅜-in. extension is brought out through the generator case or housing, to which a lever is attached. This lever, in turn, is connected by a simple link to the carbureter lever.

The spring shown in the dashpot cylinder is so arranged that the generator body is forced around by it in the direction opposite to that of armature rotation, which is clockwise (when looking at the drive end), and the connection of the lever to the throttle is so made that the throttle is open when at rest, and the spring has rotated to the generator body on its trunnion bearing to this position.

When the engine is started and the generator commences to generate current, there is a magnetic drag on the field, and at a generator speed of 600 r.p.m. this is sufficient to overcome the spring, causing the generator body to rotate in the same direction as the armature, *i. e.*, in a clockwise direction, and to throw the throttle sufficiently to maintain this predetermined speed. There is a minimum speed regulation of 600 generator r.p.m., for it is supposed that the generator will be driven at one and one-half times engine speed; therefore, the low governing speed is 400 engine r.p.m. Any higher speed can be secured by merely inserting resistance in the field circuit by means of the adjustable rheostat.

Voltage Varies with Speed

If, on account of an increased load, the engine slows down slightly, the voltage and magnetic drag decrease, and the spring opens the throttle, maintaining the desired governed speed. If the load is reduced and the engine speeds up a few revolutions per minute there is an increase in the voltage and current output, and a resultant increase in magnetic drag; therefore, the spring is overcome by the magnetic drag and the throttle is closed. The current output is automatically controlled and therefore is approximately 6 amp. at all operating speeds. One and one-half amperes are utilized for ignition, while 4½ amp. are continually going into the battery.

The starting switch is mounted on top of the motor and is provided with tunnels to take the end of ½-in. steel conduit through which the starter cable is run. The starting switch is of the lever and shaft type.

The generator is inclosed in a cast iron case, leaving a large inspection hole or hatch open at the top, which is provided with a pressed steel cover with extremely wide flanges and drawn down by two bolts centrally located, thus assuring a dust and water tight joint with the generator case. In the ignition distributor the principles of the Remy battery ignition design have been closely followed out.

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PHOTOGRAPHS are reproduced in British aircraft papers of the new Curtiss airplane factory at Buffalo, in a partial state of completion, and some figures of its size are given. The building is stated to be half again as long as the Hamburg-American liner Vaterland. In its construction 5800 tons of steel and 7,000,000 board feet of lumber were used. Nearly 3000 men were at work at one time in the erection of the building and the whole contract price was in the neighborhood of $5,000,000.

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A COPY has been received of a booklet dealing with the history of the Studebaker Corp. It is written by A. R. Erskine, president, for the information of stockholders, dealers, employees and friends of the corporation. The story of how the Studebaker organization started from very lowly beginnings and progressed until it became the greatest wagon manufacturing concern in the world, then entered the automobile business and became an important factor in this industry, is certainly a most interesting one. The book also contains a résumé of the present financial status of the corporation. We understand that copies may be had on request to the company.

How Canada Is Rapidly Becoming a Manufacturer of Accessories

Business, Once Largely Imported, Has Jumped in Three Years Until Jobbers' Stocks Are 66% Canadian Made

TORONTO, April 30—There are thousands of people in the United States — which over here are called "the States"—who imagine that Canada is a land of farm lands and small factories and that the business man who wants goods to sell must import them from the United States or some other country.

This condition used to be true to some extent, but to-day Canada is making more automobile accessories than ever before, and is supplying her own needs in this line to an extent that may surprise many in the trade in the United States.

A. M. Battcher, of Hyslop Bros., Ltd., states that this accessory jobbing house is buying approximately two-thirds of its goods from manufacturers in the Dominion, and that this volume is growing yearly.

There seems to be nothing in the automobile accessory line that will not eventually be made by enterprising Canadian capital. The Conservative party, which corresponds in some of its ideals to the Republican party in the United States, favors a high protective tariff, and manufacturers generally are in favor of such a wall, for it would enable them to build large businesses without having to meet the competition of the enormous companies from across the border.

The last two years have seen considerable progress in the accessory manufacturing trade in Canada. Naturally, the Canadian wholesaler looks with favor on a Canadian product, and, when other things are equal, he is likely to patronize the Canadian institution.

But there is an even more important reason. With the Canadian factory almost at his door the Canadian jobber can get goods quickly. This means that he can turn his capital with Canadian goods once a month, whereas the delays due to getting goods from factories in the United States permit him to turn his capital only about five times a year. This means, in plain figures, that a jobber with $1,000, trading with Canadian goods, can handle as much in a year as though he had $2,000 or $2,200 and handled goods from "the States."

These latter figures presuppose an equality of price, but, as a matter of fact, the equality of price does not obtain, for the Canadian goods, due to the duty, are generally somewhat cheaper than the finished product from "the States."

The Canadian duty is seldom less than 30 per cent. Sometimes it is 35 and 40, and to this there now is added a war duty of 7½ per cent.

This ability to turn capital more frequently is one of the prime arguments in favor of buying Canadian goods.

The railroad situation in Canada has not been in such a condition as it has been in the United States. Shipments have not been under such a terrible handicap. All this has helped the growing Canadian manufactories. Canada is rather proud of the way in which she is growing industrially. She has had a taste of this larger industrialism and should go forward from now on more rapidly than before.

As to products, there seems to be nothing in particular that cannot eventually be made in Canada. To-day there are some goods made here, while goods of almost the same nature are imported. It seems to be simply because no one in Canada has happened to take up the line in question.

As in "the States," many of the accessories are, or were, side lines of companies that had other businesses as their main venture.

The main industrial area is around the western end of Lake Ontario. Toronto, Hamilton, Niagara Falls and London are the manufacturing towns. Toronto, with more than a half million people, has a diversified line of industries that insures a firm prosperity. There are no single big industries such as steel, or grain, or chemical products, which make so many cities rather one-legged, and when the one leg fails the town has hard times. The industries of these manufacturing cities are varied.

Just to skim through a jobber's catalog and select accessories that are Canadian made, there are:

Tires, made by pure Canadian companies and by Canadian branches of companies from "the States."

Tire chains; there is no Weed patent situation here such as exists in the United States.

All kinds of tire sundries; Shrader gages; Adamson vulcanizers; tire holders; jacks; foot and robe rails; seat covers for Fords, and all other cars.

Tool boxes, and some tools, but not complete tool kits; pedal pads; bumpers; lenses; lamps, but no lamp bulbs.

Flash lights; dry batteries; and one company is getting into wet batteries.

Ignition cable; oil cans, funnels, measures and grease cups; rubber hose, but the hose clamps are imported; veneer and polish. Although there is no complete line such as the Northwestern Chemical or Rie-Nie line there are items from those classifications.

Cleaning brushes; chamois; repair cradles; endless and fan belting; Leakproof piston rings are made here under a manufacturing arrangement by Banfield & Son, Toronto.

Other Canadian goods are: cotter pins; demountable wheels; valve lifters; pliers; monkey wrenches; gauntlets;

Made in Canada

Tire chains
Schrader gages
Adamson vulcanizers
Jacks
Foot rails
Robe rails
Seat covers for all cars
Tool boxes
Tool kits
Tools
Tire holders
Tire sundries of all kinds
Pedal pads
Bumpers
Lenses
Lamps
Flash lights
Dry batteries
Ignition cables
Oil cans
Funnels, measures
Grease cups
Rubber hose
Veneer and polish
Cleaning brushes
Chamois
Repair cradles
Piston rings
Endless and fan belting
Cotter pins
Demountable wheels
Valve lifters
Pliers
Monkey wrenches
Gauntlets
Woodworth treads
Reliners.
Dust coats
Hood covers
Lap robes
Portable garages
Patches, cut fillers
Tire tape
Rubber mats
Windshields
Windshield cleaners
Ford hub caps
License brackets
Auxiliary radius rods
Ford cut-outs
Lined and unlined brake-shoes for Fords
Oils and greases
Radiator compounds
Electrical and hand horns
Shock absorbers
Spark plugs
Hydrometers
Connectors
Plugs and sockets
Generator brushes
Electrical parts
Grease guns
Brake lining
Copper gas jets
Socket wrenches
Carbon and bearing scrapers
Breast and hand drills
Garage equipment
Goggles
Speedometers
Steering wheels
Ford fenders and hoods
Crank case oil gages for Fords
Timers
Switch locks
Vibrators
Coil parts

dust coats; hood covers; lap robes; portable garages; Woodworth treads; reliners; patches; cut fillers; tire tape; rubber mats, windshields; windshield cleaners; Ford hub caps; license brackets; auxiliary radius rods; Ford cut-outs; lined and unlined brake shoes for Fords, made now for the first time by the Adamson Mfg. Co.; oils and greases; radiator compounds; piston rings; ignition cable.

From a manufacturing and a raw products standpoint there is nothing that could not be manufactured in Canada. Much of what is now made here is made from imported raw materials, on which the duty, of course, is lower than on the finished goods.

No one now is making horns or clocks, whereas there is a good field for both and the sales especially in horns each year are good. Both electrical and hand horns are sold. Another is shock absorbers. There are lamps but no lamp bulbs. Spark plugs are imported, but the Champion Spark Plug Co. is building at Windsor.

Other imports are hydrometers; connectors, plugs and sockets; generator brushes; electrical parts; grease guns; brake lining; copper gaskets, although Canada has copper mines; socket wrenches; carbon and bearing scrapers; tool kits; breast and hand drills; garage equipment, such as compressors, etc.; goggles; speedometers; steering wheels; Ford fenders and hoods, crankcase oil gages for Fords.

Auxiliary radius rods are made in Canada but rear axle trusses are not. Timers are imported; so are switch locks, vibrators, coil parts and other electrical goods.

Canada expects the accessory industry to grow. The Motor Products Corp., at Walkerville, opposite Detroit, is starting this year with tool boxes, windshields, foot and robe rails, mirrors and hub caps.

The Kinzinger-Bruce Co., at Niagara Falls, used to be the old Carriage Mounting Co. To-day it is making bumpers, tire holders and robe and foot rails.

The trade's leaders are enrolled in the Canadian Auxiliary of the National Association of Automobile Accessory Jobbers. Among them are: Adamson Mfg. Co., Hamilton, vulcanizers; Canadian Lamp & Stamping Co., Ltd., Ford, Ont., lamps; Canadian National Carbon Co., Ltd., batteries, flash lights; Champion Spark Plug Co. of Canada, Ltd., Windsor.

Kinzinger-Bruce & Co., Ltd., Niagara Falls, named above; Line & Kimball Co., Moose Jaw, auxiliary radiator rods; McKinnon Dash Co., St. Catherines, tire carriers, folding chairs, bumpers, valve lifters; McKinnon Chain Co., St. Catherines, tire chains; Richards-Wilcox Canadian Co., Ltd., tire carriers and jacks; Splitdorf Electrical Co., Toronto, magnetos; Kelsey Wheel Co., Windsor, demountable wheels.

Tires are made here by the Dunlop Tire & Rubber Goods Co., Toronto; Gutta Percha & Rubber Co., Toronto, Maltese Cross tires; Canadian Consolidated Rubber Co., Kitchener, Ont., related to the U. S. Rubber Co.; Goodyear Tire & Rubber Goods Co., Toronto; K. & S. Tire Co., Toronto, K. & S. tires; Partridge Rubber Co., Guelph, Partridge tires; Oak Tire Co., Oakville, Ont., Oak tires.

Of course, everybody knows that the Gray-Dort, McLaughlin-Buick, Ford, Chevrolet, Overland, Studebaker and Briscoe are all made in Canada. Dodge is said to be putting up a Canadian factory.

The Canadian jobbers of accessories are growing. Their business jumps up a peg each year. They are also like the rest of their great country, intensely loyal to it and enthusiastic about its future.

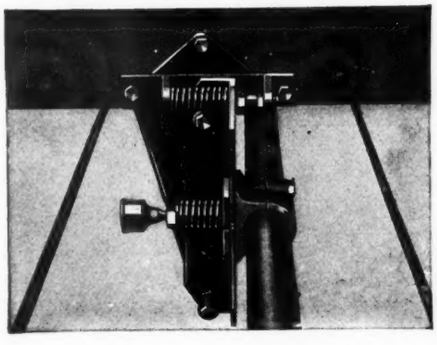
The jobbers are enrolled in a Dominion association, affiliated with the association in "the States." The members are: Bowman Bros., Ltd., Saskatoon; The Chapin Co., Calgary; Canadian Fairbanks-Morse Co., Ltd., Montreal; Cutten & Foster, Ltd., Toronto; Michael Ert, Ltd., Winnipeg; F. S. Evans & Son, Windsor; Motor Car Supply Co., Calgary; Great West Saddlery Co., Winnipeg; Hyslop Bros., Ltd., Toronto; Northern Electric Co., Ltd., Montreal; H. W. Petrie of Montreal, Ltd.; Western Motor Supplies, Ltd., Regina.

Floating Bearing for Propeller Shafts

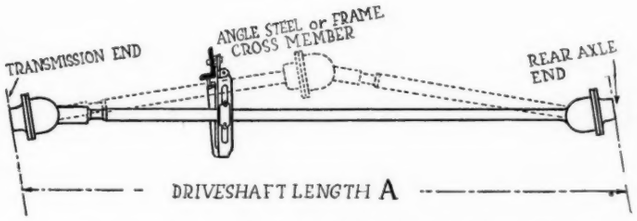
A FLOATING bearing for motor truck drive shafts is being introduced by the Barker Factory, Norwalk, Conn. The designer of the device claims that it will prevent whipping of the drive shaft, thus lengthening the life of universals and reducing the vibration of the whole machine.

The floating bearing consists of a support, a pivoted arm, and a shank bearing with tension springs. It is being manufactured in assembly form ready to attach without adjustment, and may be bolted to the frame of any truck without altering the construction.

In practice the bearing has free movement up and down with the drive shaft in a slot provided in the pivoted arm. A coiled compression spring on the shank of the bearing, which passes through the slot in the arm, slightly resists free movement of the shaft away from the arm and another coiled compression spring at the top of the arm acts similarly in the opposite sidewise direction. The arm is pivoted at the lower end.



Barker's floating bearing.



Showing arrangement of shaft and floating bearing and comparison with double propeller shaft

More than four years ago C. L. Barker had a truck with a long drive shaft which whipped out. After repairs were made the same trouble recurred, and Mr. Barker set about devising a means for overcoming the difficulty. A flexible bearing was placed on a shaft, but it was found this resulted in considerable wear on the shafting.

Next Mr. Barker devised the floating bearing, which can be moved in any direction, but which is so arranged that it resists movement of the shaft in a circle of a diameter greater than its own. One of these bearings was placed on a truck having a drive shaft 1¾ in. diameter, 91¼ in. long, and a single set of universals. This truck has been in constant service since Jan. 10, 1915, having covered 30,000 to 50,000 miles. During this time it has not been necessary to replace either the drive shaft or universals.

During the past year the bearing has given similar service on 2-ton trucks having drive shafts 1¾ in. diameter and 108¼ in. long.

A good idea of the arrangement of the bearing relative to the bracket and the form of the latter may be gained from the halftone illustration.

Protecting Finish During Drive-aways

Cars Can Be Given a Coating of an Oily or Greasy Material Such as Paraffin, or Can Be Protected by a Suit of Overalls

Car protected by a suit of overalls against injury to its finish

By C. J. Shower

THERE is no reason why cars should arrive at their destination, after a drive-away, with their finish in poor condition. Since the advent of drive-aways, dealers as well as manufacturers have burned the midnight oil to devise schemes for protecting the finish of cars that are driven some distance before getting into the hands of the user, and their efforts have not been in vain.

F. S. Bliven, Cadillac distributor in Baltimore, invented a very pretentious suit of overalls to put over his cars. The outfit consists of a padded hardwood stick that extends across the radiator, from which straps run up over the windshield. Other straps made of webbing run around the entire car. To this webbing the curtains are fastened. The right door is left free, and the driver is able to get in and out of his car because a piece of thin steel, which fits into the socket of the rain-curtain holder, is turned over.

These covers were made in Bliven's own shop, and the original set of three covers for three cars cost him approximately $100, figuring material and time at cost. When folded up, ready to be carried by the men on the train, they weigh 39 lb. each, and make a package the size of a suit case. It takes only 20 min. to adjust them and only about 3 min. to take from the cars.

On both sides of the car, fastened to the running board, are hardwood boards which hold down the lower end of the cover. Two straps lead from these boards to the straps around the car, and keep the cover from sagging. Over the front springs and radiator, and separate from the covering that goes around the body of the car, is a covering that is fastened to the splash pan. These coverings are made of rubberized top material.

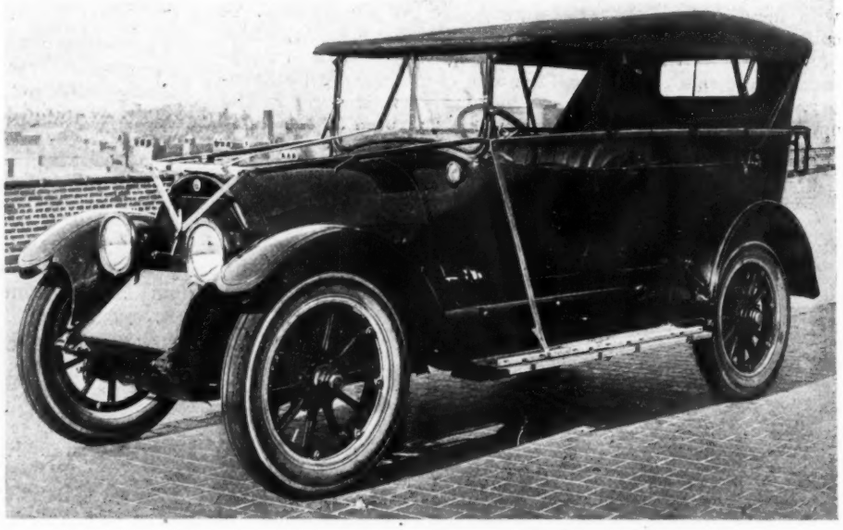
This "overall" has proved so satisfactory that many other Cadillac distributors have adopted its use. A similar outfit could be made for other cars.

The Paige-Detroit Motor Car Co. applies a coating of paraffin to all the cars leaving the factory overland. The cars are driven up alongside the curb, and one by one they are sprayed. A can that holds a quart of the liquid is connected with an air line. By depressing a small lever with the thumb an invisible spray is started.

As soon as the paraffin settles on the body of the car it immediately becomes hard and forms a coating which prevents any dust and mud from reaching the finish. After this has been removed in the manner explained later, the car looks as good as new.

A number of dealers and manufacturers have adopted the use of certain oils and greases, the most popular of which is vaseline. This, being put on the body with a rag, requires no special equipment and offers very little trouble. It is a very satisfactory protection for the surface of cars. Some dealers use olive oil in the same manner and find it just as good or better.

The difficulty lies not with the application but with the task of removing the coating. Vaseline or any oil or grease can very easily be removed with hot water.



Car with harness ready to receive the overalls

Water hot enough to remove it is not hot enough to mar the finish on the car, but care must be used in this to keep the water just above lukewarm.

The water is flowed on from a hose by the same method as is ordinarily used in washing a car. The car is gone over afterward in the usual way with cold water and then polished. After the cleaning process is over nothing remains to tell that a preparation was used.

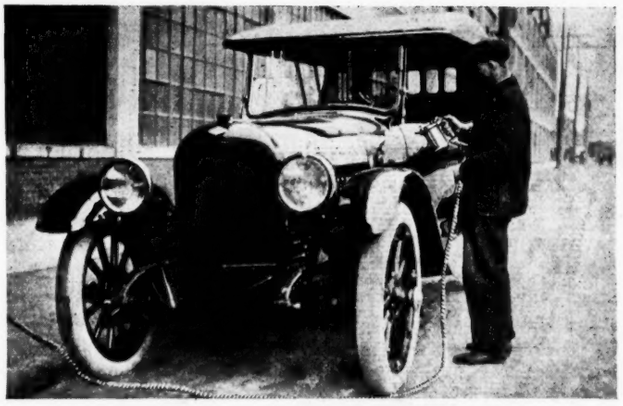
Vaseline or any oil preparation is different from paraffin in that it remains soft through the entire trip. Unlike paraffin, it collects dust. In doing so, however, it prevents the dust from reaching the finish.

The disadvantage of using paraffin lies in the fact that it is difficult to remove. Being a hard coating over the entire car, it is necessary to apply much hotter water than necessary for vaseline This, the dealers complain, has a tendency to leave a residue on the finish which makes it almost impossible to restore the luster. Vaseline, on the other hand, being already in a partially melted state, flows off with the water very easily.

Another preparation successfully used by the Cadillac Motor Car Co. is an oil that can be applied with a rag. In spite of its recommended use, complaints have reached the factory that cars coated with the preparation had ruined the finish. It was stated that after being washed, the cars were badly streaked and would have to be revarnished. The factory sent the man who made the preparation to the dealer. It was found that most of the trouble was due to the fact that the men in the shop were afraid to rub. Through this experience the company was led to offer the following directions for the satisfactory removal of the preparation:

1—Drivers should stop about every 200 miles during the course of the trip and rinse the cars off if they are muddy, but not wash them.

2—Proceed to clean the cars as soon as possible after their arrival, because if they are left the preparations will harden.



Applying a coat of paraffin to protect the finish

3—Rinse off all dirt with hose.

4—Wash the car with lukewarm water and sponge and rinse it off again.

5—Dry with a clean chamois skin, which has first been soaked in water and wrung out.

6—When thoroughly dry, apply polish with waste and rub off. It is important to use an up-and-down or side-to-side movement rather than to "just rub" and move the hand in a circle. Do not be afraid to rub hard; in fact, it is necessary.

7—If the polish does not take all of the preparation off (as it may not on the hood and cowl), use a little rotten-stone with the polish, or apply rotten-stone and water, using a piece of felt. Then rinse off, dry with chamois and apply polish to the car.

The company claims that if these directions are followed, the preparation may be removed satisfactorily without damaging the finish.

Proper Balance Between Commercial and War Work Not Yet Struck

(*Continued from page* 859)

view of the amount of Government material passing over this road daily, it would seem that action by the War Department direct would be more logical. There is scarcely any doubt but that in Europe a road of equal military importance would have been rushed to completion by a regiment of engineers. In delays and damages this road has already cost the Government many times what it would have cost to put it in first-class condition.

This tractor carries the gas bag for a French observation balloon, and also acts as an anchor

The material situation is again becoming acute. It has been responsible for a reduction in manufacturing programs during the past two or three weeks in many plants. The confusion in priority schedules has had something to do with this, but on close examination the difficulty is due not so much to a shortage of material as to a shortage of haulage facilities, which brings us back to the transportation problem.

Summing up what has been said, if there is one point which stands out more clearly than any other, it is the advisability of the Government permitting sufficient commercial production to permit the maintenance of distributing organizations by the factories. The automobile distributor can fill out his line to some extent, in certain sections of the country, with tractors and trucks, but a business productive of such handsome returns to the Government in taxes and contributions should be maintained.

As a matter of immediate necessity from a transportation standpoint, the trunk line highways of the country, which from the neck of the bottle through which the industrial output of different territories must pour because of the inadequacy of rail capacity, should be maintained under Government supervision, with the co-operation of local authorities. The roads should be maintained in serviceable condition in summer and free from snow and ice (where ice blocks the traffic) in winter.

Engine Test Laboratory

Special Building of Tractor Manufacturing Plant for Experimental Development of Engines

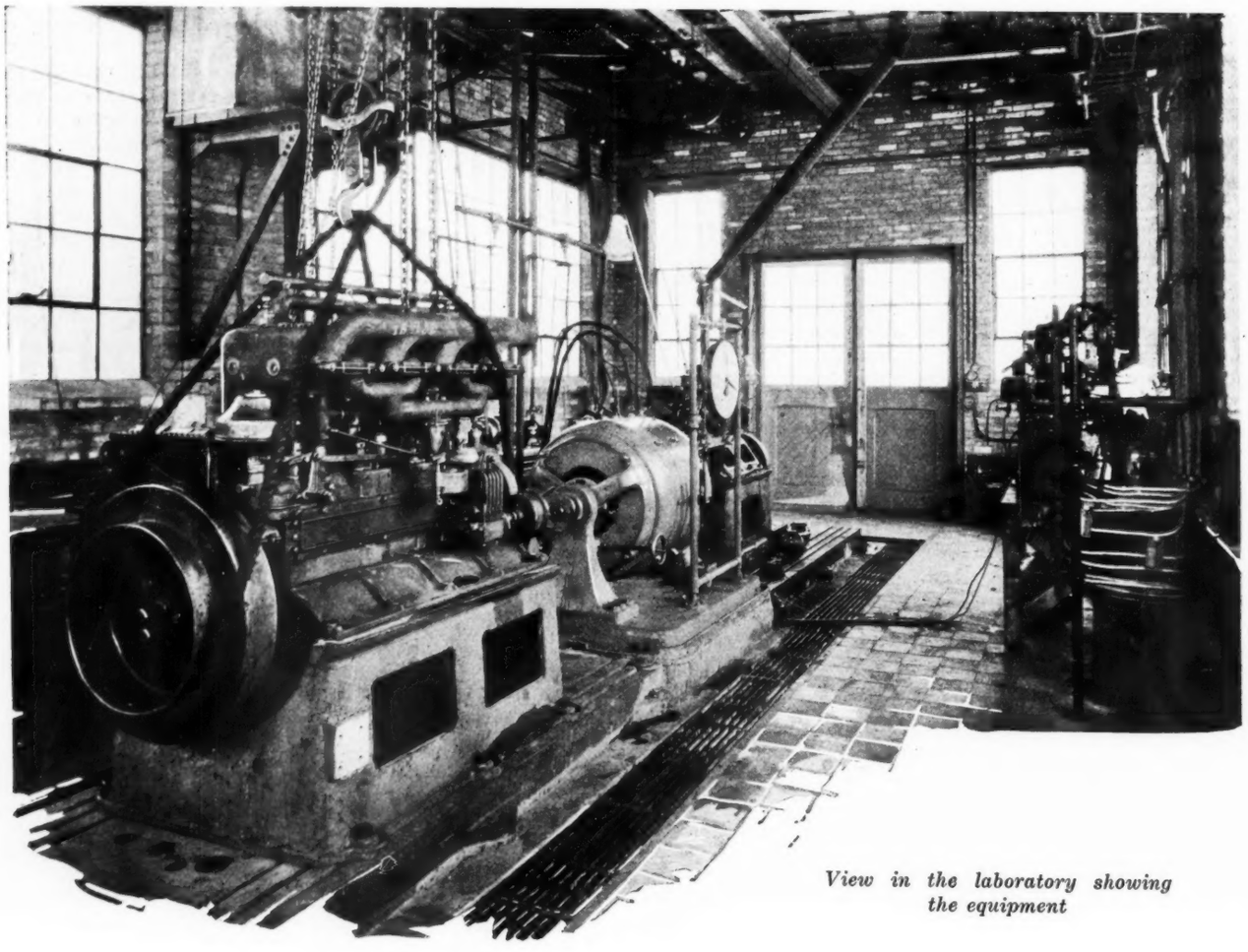
A WELL-EQUIPPED mechanical testing laboratory has recently been completed for the Minneapolis Steel and Machinery Co., Minneapolis, Minn. It will be noted that the base for testing the engines is of cast iron with T-slots. A 5-ton chain hoist travels the entire length of the building from door to door. The exhaust pipe is so arranged that it will telescope, and at the same time travel radially, so as to be adjustable to any size engine. The exhaust gas passes through the side wall of the building, so that it can be watched through the windows. At the time of writing, the fuel pumps were not installed, but there will be two of them, one connected to a 500-gal. kerosene tank and the other to a 100-gal. gasoline tank, both tanks being buried in the ground just outside the building. The fuel measuring will be taken care of automatically. Cooling water circulates through a tank to maintain an even temperature.

The dynamometer is of Sprague manufacture, and has a capacity of 100 hp. at 500 r.p.m., but can be run up to 2000 r.p.m. if desired. The electrical resistance for the dynamometer is located on the wall above the switchboard, but the power can be pumped into the main line of the factory if so desired. The dynamometer can be run in either direction.

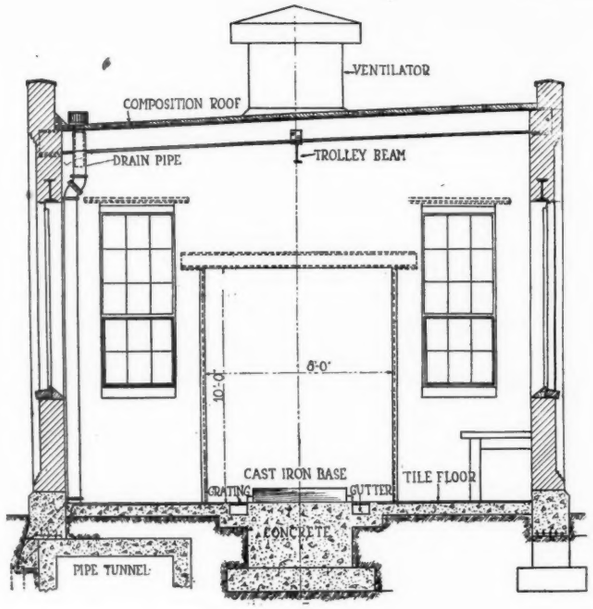
The laboratory building

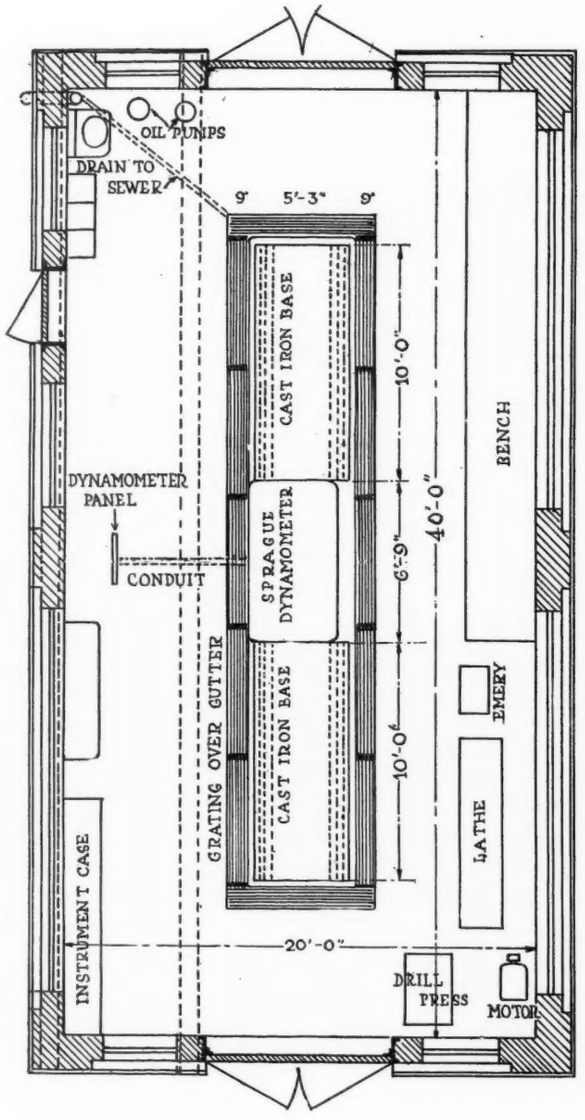
Electricity, water, kerosene, gasoline, city gas and compressed air are led into the building through a tunnel. The experimental laboratory is located close to the general offices and the painting and testing shed for tractors.

The drawings on the opposite page are a vertical section of the building showing the foundations, and a floor plan showing the pipe trench around the test stand, in which all of the piping is laid.



View in the laboratory showing the equipment





Huge Fuel Reserve

Peat Extensively Used as Fuel in European Countries—Available for Gas Making

MUCH information on the peat deposits of the United States has been circulated from a number of sources during the past several years.

The United States Geological Survey in particular has been urging the commercial development of these vast deposits of fuel as one of the practical methods of alleviating the present fuel shortage. Although peat has never been extensively used as fuel in this country, because of the abundant supply of coal, which can more readily be prepared for consumption, and in normal times more cheaply brought to the consumer, it has long been used in Europe, where 15,000,000 to 20,000,000 tons are consumed annually in generating heat and power.

The attempts made in this country to manufacture peat fuel on a commercial scale have not been successful, but the failure appears to have been due not to a lack of market for the product but to the lack of sufficient capital, to the inexperience of the operators, and to preventable engineering errors. It is said that air-dried machine peat, which is but little inferior in calorific value to many grades of lignite coal, can be produced at a cost ranging from 75 cents to $2.50 a ton, the exact figure depending on the size and efficiency of the plant; and it is believed that in some parts of the country it could successfully compete with other fuels for both domestic and industrial use. It burns with little smoke and ash.

Recommend Investigation of Peat

The wide interest in the more extensive use of peat in the United States is expressed in recent messages from the governors of Maine and Massachusetts to the legislatures of those states, recommending an investigation of the local deposits of peat and its possible use to relieve the present shortage of fuel.

The lack of other fuel in many European countries is now being met in part by an increased use of peat. According to United States commerce reports, 216 peat machines were in operation in Norway in 1917, compared with fifty-five in 1916 and thirty-six in 1914. Among these were two automatic machines, each costing $13,400, having a daily capacity of 30 to 40 tons of fuel, and requiring only two men for operation.

Peat consumed in a properly designed gas producer yields gas of good quality and in abundant quantity, in comparison with the yield from coal, as well as many valuable by-products. This is perhaps the most effective utilization of peat fuel for generating heat and power, because peat used in this way does not need to be so carefully prepared nor so thoroughly dried as peat designed for consumption under steam boilers.

Specific information with regard to the use of peat in gas-producing plants and for other purposes is given in Bulletin 16 of the Bureau of Mines.

Nature and Distribution of Deposits

Peat is a dark-brown or black residuum produced by the partial decomposition of mosses, sedges and other vegetable matter in marshes and like wet places. Most of the peat deposits of this country occur in depressions and poorly drained areas in regions where the temperature of the air and the soil is low in summer, and the humidity of the air is high. The most extensive peat beds are found in New England and around the Great Lakes, where the climate and the topography are favorable to the accumulation of partly decomposed vegetable matter. Many deposits are found also in the Atlantic coastal plain, from New Jersey southward to Florida. In regions of heavy rainfall along the Pacific Coast peat bogs occur wherever the drainage is so greatly interrupted that the soil becomes permanently saturated with water.

(*Continued on page* 892)

Teutonic Trade After the War

Possibilities of American Trade in Central Empires—Organization of Germany's Automobile Industry and Its Plans for Post-War Export Trade

By E. A. Langdon

GERMANY is making bold plans for her automobile industry after the war, as well as for several other industries which are in strong favor with the government. Previous to the start of the war the automobile industry in Germany was one of the most progressive lines of the country from the standpoint of business, and from the start of the war the government program has whole-heartedly supported the industry. The German automobile industry has in turn supported the program of the government which provides for an enormous subsidy to the German Mercantile Marine interests. A short time ago this matter came up in the Reichstag and legislation embodying such subsidy was passed in spite of the vigorous protest of the socialists. Therefore German exporters will enjoy the benefit of very low freight rates after the war, which will enable them to sell automobiles cheaper.

Post-War Trade Plans Completed

Germany already has a systematic and comprehensive program mapped out for her after-the-war activities. Only a shortsighted policy of American makers could pass over these matters lightly, and the sooner American manufacturers realize that their German competitors, after the war, will be more powerful than ever before, the more capable will they be to cope with their own tasks.

Many Americans may imagine that Germany, as well as the other Central Powers, insofar as their alliance with the empire will survive the war, ought to be difficult to invade commercially. This is a fallacy. Germany, after the war, will not only be a ready buyer of large quantities of raw materials for the manufacture of automobiles, but will import great quantities of finished cars. By doing so, immediately after the war, and for the next few years following it, she will be enabled to devote all her manufacturing strength to export trade, and to the consequent rehabilitation of her international commercial position.

Automobile Prospects

When the writer, in the course of a conversation on this subject with one of the big men of the German industry, ventured to suggest that perhaps America, whence most moderate-priced cars must come, might prefer not to sell to Germans, he received the answer that Germans would be willing, if necessary, to pay better prices than anybody else, and that it will be economically impossible to refuse her bids. Of course, such a program may seem difficult or even impossible; but the Germans, fully awake to the enormous possibilities of intelligent and equitable government control or assistance, will strain their every national resource to realize such schemes. No one in Germany expects the series of popular government loans to end with the war. The system of these loans proved too advantageous in many ways to make it probable that this method, whereby the entire nation is vitally interested in national enterprises, will be foregone.

It is not unlikely that the private ownership of thousands of automobiles will be permanently changed after the war. An era of high prices is expected to prevail in Europe after the war, and automobiles, except commercial ones, are apt to be classed at least as semi-luxuries. This will make registration and taxes, and possibly fuel sold for passenger cars, rather too expensive to enable any but the very wealthy citizens to own cars for personal use. Such a condition would call for an army of taxicabs in every large city, as occasions when a man absolutely needs an automobile will be frequent, and since corporations operating fleets of taxicabs will be able to do so more efficiently and economically than private owners. The same, of course, will hold true of flying machines.

It has been stated that practically every German automobile is at the front to-day. If automobiles are transferred from one front to the other, they are usually sent on railroad trains, as the shortage of coal is less pressing than that of gasoline. In the case of whole armies being shifted, however, the vehicles supplement the work of the railways. In any case, the empire has found it desirable to perfect its system of automobile roads, and has been able to do so by the work of military prisoners, especially Russians, of whom there are many more than 1,000,000 in Germany. The cost of such labor, beyond the food and clothes needed by the men, is very small, and, of course, prisoners can be worked harder than organized German workmen. Strange to say, the labor organizations have had very little to say against such practices, which really amounts to the using of coolie work for national purposes. Attempts of the Government to use the prisoners in the mines, however, have met with prompt remonstrance on the part of labor, insisting that this well-paid work must be reserved to natives.

Control of Oil and Rubber Markets

Germany will probably be a horseless country after the war, for the stock of horses has been decimated, partly by military operations and partly for food purposes. It is generally admitted that automobile transportation will be at least as important as the railroads of the country in the future, and it is interesting to note how the fuel problem is to be coped with. It is no secret that German capitalists are ready to grasp control of the great Caucasian oil fields of Russia, and there is hardly a doubt that this will be one of the first things they will attempt as soon as they get the opportunity. Needless to say that oil is not the only Russian product which they aim at cornering; but such plans as these explain the eagerness of the empire's business class to conclude a separate peace with Russia, no longer to be feared in a military way.

By similar peaceful penetration, business men intend to obtain control of the South American rubber market when the world is once more open to them. It must be understood that the State is now at least a moral partner in every German import and export business, and will render fargoing assistance to each enterprise of this sort.

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The skillful operation and repair of automobiles forms to-day part of the curriculum of many thousands of recruits drafted into the army. Half of the education in this respect is to point out the ways whereby the most economical use of vehicles can be obtained, and German engineers are optimistic in prophesying that after the war the average automobile in the empire will consume from 20 to 25 per cent less fuel than the average car in other countries. Nor is this education restricted to the army. The boys studying at the "Realgymnasien"—schools preparatory to a technical course in peace time—are given the option to receive a thorough course in the construction, operation, care and repair of automobiles, and countless students are availing themselves of this opportunity.

It is not very far from correct to say that all automobiles in the enemy countries are to-day used by the armies. Whatever passenger and commercial cars are not used in this way, are in an impossible condition. Such taxicabs as still exist in Berlin and Vienna, for instance, would have been relegated to the junk heap long ago in times of peace. But necessity is the mother of efficiency, and the most incredible machines continue to be used until there is nothing left to do but to melt down their parts for new applications.

Motor Manufacture Under Government Control

Referring to automobile manufacture, this industry is now practically under government control. Government inspectors are working at each plant, and, as is true of so many other fields of industry, the rights of the workmen have been seriously curtailed. The automobile industry has experienced practically no strikes in 2½ years, because such strikes would have been suppressed by the army. As a result, the German workers have largely thrown to the winds the principles of trades unions, and, in the automobile industries, as well as others, are now organized in industrial unions including every hand—no matter how occupied—in those entire industries. Such organizations could carry out very effective strikes; but it is a tacit understanding among the working class that this expedient will not be used except if there should be a determined effort to overthrow the government, in fact, the entire present system of production. The novel manner of organization has made great strides especially since the outbreak of the Russian revolution, which has been a cause of ceaseless worry to the lords of the country, however little they admit this fact.

Standardization Carried to the Limit

All told, in spite of these complicated conditions, the industry is quite profitable. But the heads of the industry understand that matters might change after the war, and they are planning as best they can to guard against setbacks in the future. Their plans include in principle a huge organization of all automobile plants into a trust, rather than a "Kartell," which is a trust for export purposes only. It is also planned to carry on an extensive world-wide campaign for the purpose of advertising and selling their products which are to be standardized down to a very few types. This scheme is quite in keeping with the ideas of the government, which intends to do the nation's export and import business through enormous agencies pooling sales and purchases abroad to obtain the most profitable results.

One of the most striking facts of the matter is the change which has come over the whole industry during the past three years. When the war broke out automobiles in Germany were of numerous types, corresponding to the many individual factories which had developed their products with the help of privately owned patents, by the work of engineers who aimed at the advantage of these factories. While this condition continued for more than 18 months following the outbreak of the war, a change which had all the while been working gradually became general then. The experiences of the first year and a half of the war had shown up the advantages and disadvantages of different types and details of construction. These points had been carefully noted and analyzed by the military authorities in charge of the army's transportation department, and so it became possible to lay down lines of standardization, along which automobiles were manufactured from that time on. The new designs were minus many parts not absolutely necessary to the operation of the vehicles in war service, and on the other hand included such improvements as had proved serviceable and in many cases had been designed as the result of distinctly felt wants. The latter included, for instance, accessories for the exact recording of the work of the cars, of fuel and oil consumption. Then, there are accessories insuring the most efficient utilization of gas and oil. The general construction of automobiles is now lighter, yet no less rugged than before the war. A great many parts, formerly made of steel, have been replaced by aluminum, and special alloys the composition of which is, in every case, a secret jealously guarded by the government. If this change indicates a shortage of iron and steel—perhaps this is so. On the other hand, it seems that the elimination of iron and steel, as far as this is possible in automobile construction, serves the double purpose of making these materials available for other military purposes, and of reducing the weight of the vehicles, whereby a great economy in fuel is made possible.

Tractors in Large Numbers

One branch of the automobile industry which was of small import before the war is the production of agricultural vehicles. The war, by forcing the utmost economy in man power, has demonstrated to the empire the great practical value of tractors, and these are now used in large numbers in the agricultural sections of the land. The peasant population has been educated to the use of these machines, and there is no doubt that machinery will completely supplant animal power in agriculture after the war.

Nothing has as yet been said of aeronautics. Under the stress of war the production of flying machines and dirigibles has been very much increased, and to-day is consolidated into a standardized industry. The types of airplanes are few, but the machines are efficient, fast and so constructed as to work economically, as far as fuel consumption is concerned. Enough has been written about the work of flying machines in actual warfare, and it is hardly necessary to mention that there is just as systematic an education of flyers as there is of automobile drivers. The flyers are picked, as a rule, from the physically and mentally ablest expert drivers, and the picking is done by army officers who take very little consideration of the private desires of individual soldiers. What has not been written or told frequently, so far, is the fact that extensive plans provide for very general use of flying machines for passenger traffic after the war. With multi-passenger airplanes already tried out, the preparations have already been made to carry on a regular fast air traffic over long distances, such as Hamburg-Vienna, Vienna-Constantinople, etc. Such a development will not be anything radically new to the people who are accustomed, in many sections of the country, to see airplanes every day. The war has greatly increased the prestige of planes, as compared with Zeppelins and Parsevals, especially in view of the fact that dirigibles

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proved much less effective in military operations than people had expected. Ever since the end of 1916, when the declaration of ruthless submarine warfare was once more announced, the airplane industry received the particular attention of the government, in view of the probability that America's entrance into the war would ultimately lead to the most intense aerial warfare, both at the front and in the Fatherland. The confidence of militarists regarding such developments seems to indicate that not only is it expected to produce a great number of German machines before such possibilities become facts, but that a system of several lines of aerial defense is to be tried against attacks in the air. However, the people are not as calm as the officers, and do not like to think of the chance of German cities being bombed after the fashion in which London, for instance, has been attacked repeatedly.

Though the plane type of flying machine is the only kind used now, there are rumors of other classes being developed. These include probably some designs in which both the support and the propulsion of the machines are obtained by means of propellers, making possible a more rapid rise and forward movement. It is obvious, however, that a planeless flying machine if once upset is hopelessly lost, and therefore such machines offer few attractions for war service. In peace time, however, a planeless machine, equipped with a suitable parachute arrangement, should prove quite advantageous.

Rumanian Oil Supplies Saved Germany

The fuel situation, by the way, was particularly critical early in 1916 and serious apprehension was felt in responsible circles regarding the future supply. Whatever was left available of the Central Powers' own oil resources was not in very efficient condition, as the early Russian advance had brought about the destruction of many plants. Moreover, the idea that the war might be indefinitely prolonged, and the chance of further reverses in the East, forced the nation to give serious attention to the question of the oil supply. This situation went hand in hand with a parallel one in the food matter, and it was in consequence of this that preparations were made to obtain, in some way or other, control of the wheat and oil output of Rumania. The manner in which this plan was carried out is a matter of history, and it should only be noted that the Rumanian campaign not only served to bolster up the waning war spirit of the population, but also to insure an increased supply of the above-named commodities.

Of course, as is well known, gasoline, or benzine, as the product is called in Germany, is not the only fuel used for automobile propulsion. There are benzol and alcohol, and they are used in no small quantities. As a matter of fact, it would seem that the needs of the civilian population, as far as coal and potatoes are concerned, were satisfied to a lesser degree than would have been possible, had not the military machine preferred to claim a large share of these materials for fuel production. The principle followed seems to have been that it was determined scientifically on how small a supply of coal and potatoes the average healthy individual could subsist. Thousands of less healthy citizens suffered, and, in fact, perished in consequence of this principle; but the state seemed to consider their loss a small one, if not a positive gain. The method in this madness was rarely if ever admitted by the powers that be; but now and then officers have been heard to utter remarks regarding the excellent sense of the ancient Spartans who delivered children of insufficient robustness to death. Perhaps such methods are less surprising than the patience of the population who put up with them; but this patience is explained by the systematic "education" of the nation to the idea that the empire must either win or perish.

One difficulty which no campaign has helped to solve is the rubber shortage. There are, of course, substitutes—"Ersaetze," as they are called—but no substitute is ever like the real thing. In the beginning it was well enough to insist that synthetic rubber had been developed to a commercial proposition; but it is now more or less known that rubber tires are made of reclaimed material. Indeed, there still seems to be a way of importing new rubber at fabulous prices from neutral countries, a practice forbidden by the law of the neutrals, yet indulged in by smugglers subsidized by the enemy and making a princely living. This practice, by the way, is not limited to rubber; other important materials are procured in the same way, and this underhand import trade is to no small degree responsible for the decline of German exchange in neutral countries. Needless to say that the government has learned the lesson contained in such procedures and has taken over the complete supply of such valuable materials as radium, controlled by the Central Powers.

Coal Shortage Not Serious

As has been stated above, the coal scarcity is really a trouble affecting the civilian population alone, or chiefly. The mines of Northern France are worked as much as possible, so that the supply is sufficient for national purposes. Therefore, enough fuel is obtained even for such industries as the production of saltpetre from atmospheric nitrogen, and likewise for electricity. The latter is used very extensively in the operation of trucks, and is drawn from overhead conduits by means of trolleys. It is not unlikely that this type of automobile will be largely used, after the war, instead of electric railways, as, the vehicles being lighter, less current should be consumed than by heavy stock traveling on rails. The tendency among transportation engineers in the empire is to get away, as far as possible, from rail traffic calling for special roadbeds, and to make the whole transportation system as elastic as possible. Very likely freight and passenger traffic within a radius of 50 miles will be by electric or gasoline automobiles after the war, especially if the Germans should succeed in getting kerosene and gasoline cheaply from Russia. This would leave the bulk of the empire's coal production free for industrial requirements, and permit of a considerable export to Switzerland, Italy, and the Near East.

National Automobile Export Corporation Planned

It has been stated before that the automobile business of the empire, especially so far as exports are concerned, will act as a single unit, doing its buying and selling through a huge international agency. As early as spring, 1916, German automobile makers expressed the opinion that international trade after the war would be free trade, and that therefore it would be necessary for them to produce very cheaply, if necessary, with very small profits, to compete internationally. Recognizing such a trend, they did everything in their power to meet the Government's demand for standardization of output.

It would be an easy matter to go into much more extensive detail on the development of the German automobile industry during the war, and to base thereon a further prognosis of the future. Instead of this, it should be a much sounder conclusion that the only way in which this subject can be studied is to send a sufficient number of practical men there as soon as possible after the war. A reasonably exact survey of the situation could thus be made and the best policies for after-war commerce determined.

The FORUM

Airplane Engine Test Methods

By C. F. Scott,
Sprague Electric Works

WE have read with much interest the article on "Methods of Testing Airplane Engines" in the April 4 issue.

We have been left with the impression that editorial prominence is given to a foreign practice, undeveloped in this country, new and untried so far as any American builders are concerned, a system quite without some of the most important features of the electric dynamometer test which have rendered the latter so desirable in the applications in which it is used.

As to the discussion regarding fan brakes versus electric dynamometers, any opposition to the electric system would carry with it the even greater opposition to the water brake, as the latter lacks three of the most essential advantages of the electric dynamometer, the saving of energy, the ability to start the engine, and accurate and convenient control under all conditions.

The present interest in the electric dynamometer is very widespread among airplane engine builders, and all of the so-called objections have been shown to be without foundation. Even the supposed higher cost of the electric system has diminished in significance by contrast with the investments that have been found necessary to maintain a fan brake system, including the cost of the test stands, the replacement of clubs, and the elaborate heating system required and entire loss of fuel energy.

The difficulties of fan brake testing, the inaccurate results obtained on fixed stands, the vibration troubles on torque reaction stands, the delays in production due to additional handling, the difficulties of starting, the elaborate and expensive heating system required, the frequently intolerable working conditions for the test force, the already heavy death toll from accidental blows from the fan-blades, the terrific noise, which has banished test sheds into parts remote from ordinary manufacturing centers, all of these disadvantages are overcome with the electric dynamometer to a very much greater extent than with any form of water brake.

Coal may be scarce next winter, and a system that can return 600 kw.-hr. of useful energy for every large engine tested is worth the interest of the industry which AUTOMOTIVE INDUSTRIES represents.

New Candlepower Ratings of Lamps

By G. L. Sealey*

ON Jan. 1, 1918, the various Mazda miniature lamps used in automobile service were given new ratings of candlepower. The new system of rating has in many cases resulted in an increased candlepower rating for the Mazda B lamps, while the candlepower value of the Mazda C lamps has, in several cases, been apparently decreased. The actual light output of the lamps has not been changed in any way; merely the rating has been altered. In order to correct the impression that marked improvements have taken place in the Mazda B lamps while no similar improvement has been accomplished with the Mazda C lamps, an explanation of the new method of rating is necessary.

The candlepower ratings of miniature lamps as well as of large lamps are nominal values. Under the old system, the candlepower rating was based on the horizontal candlepower value of the lamp. However, since this method of rating does not give a true indication of the relative luminous output of the various lamps, it has been considered advisable to change the basis of rating to one that does.

*Engineering Department of National Lamp Works of G. E. Co.

The new method is somewhat similar to, although not exactly the same as, the present method of rating Mazda lamps for street-series service, where a nominal rating of candlepower value assigned to a lamp is taken as 1/10 of the total lumens obtained from the lamp. Under this system a lamp rated at 32 candlepower has an output of 320 lumens, while one rated at 400 candlepower has an output of 4000 lumens, etc. Here the rating of the lamp gives an actual idea of the amount of light one may expect to obtain. With the new system for rating miniature lamps, a more nearly correct relative idea of the luminous output is obtained from the nominal candlepower ratings of the lamps. Under the new system, candlepower ratings more nearly approximate the actual spherical candlepower readings, which indicate the amount of light emitted from a lamp in all directions; under the old system, the candlepower ratings were close to the horizontal candlepower values, which measure the light in only one plane. That the new system gives a more nearly correct value of the luminous output of the lamps is readily seen from the above. A close approximation of lumens emitted from an automobile lamp can be obtained by multiplying the candlepower rating under the new system by 12½.

The Mazda C lamp, which is more recent than the Mazda B lamp, has had fewer changes made since the original rating of the lamps. While great improvements have been made in both types of lamps, the original rating of the comparatively recent Mazda C lamps was found to be approximately equal to and, in several cases, higher than the more nearly correct candlepower value under the new system; in the case of the Mazda B lamps the original candlepower ratings were somewhat lower than the nominal candlepower ratings under the new system. The Mazda C lamp still has the same advantage of higher efficiency and is the more desirable lamp to use in the majority of cases where both are available.

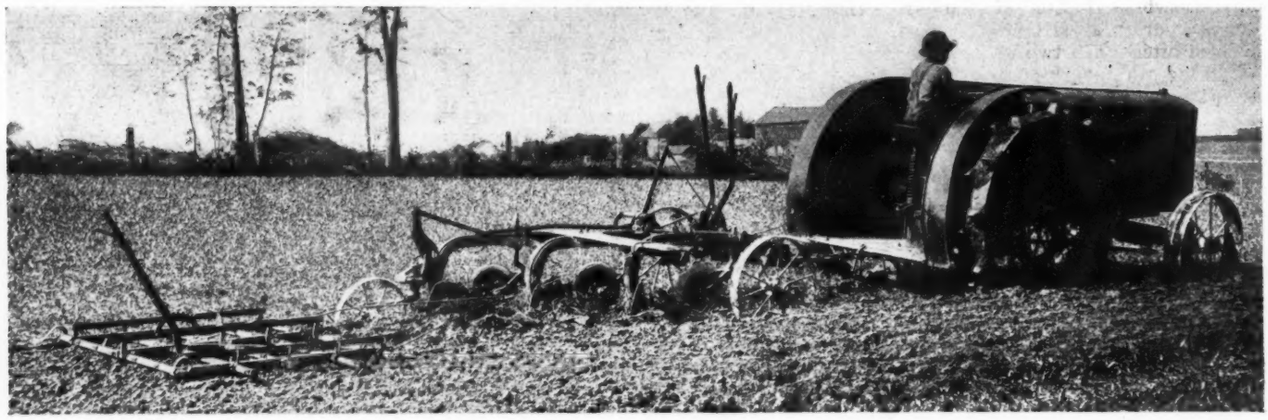
It should be mentioned in this connection that Mazda miniature lamps have each been given a "Mazda number." This Mazda number definitely specifies a lamp and when the correct Mazda number is given a lamp of the desired base, bulb, or voltage, etc., is designated. The Mazda number applies only to the lamp as definitely described in the price lists and does not apply to any other lamp of similar features. It greatly facilitates ordering Mazda miniature lamps as it is short and definite. Odd numbers specify single-contact base and even numbers, double-contact base Mazda automobile lamps.

Fallacious Reasoning

By Ford L. Prescott

UNDER the heading Fallacious Reasoning in the April 4 issue of AUTOMOTIVE INDUSTRIES, you bring out the fact that many inventors get on the wrong track when reasoning out their inventions. Some of this misunderstanding may be traced directly to advertising dope of some valve-in-head motor manufacturers. These men, who know better, attempt to befog the motor user's knowledge of his motor by such statements as the following: "In an ordinary motor, much of the force of the explosion is wasted because it exerts itself against the walls and valve heads in the valve pockets." Some also claim that the placing of a spark plug "directly over the piston directs the force of the explosion downward onto the piston" and that the placing of the spark plug in the side of the explosion chamber "wastes some of the force of the explosion," because the direction of the force is not right.

Such ridiculous statements should be "nailed" on sight, for they certainly are *not* an aid to automotive development. They are close seconds to the two instances brought out in your editorial.



Lauson "Full Jeweled" Tractor

Has Anti-Friction Bearings on Every Shaft—Pulls Three Plows and Delivers 25 Hp. on the Belt—Each Component a Separate Unit

THE outstanding features of the new Lauson Full Jeweled kerosene tractor, manufactured by the John Lauson Mfg. Co., New Holstein, Wis., include unit assembly all the way through so that any part can be reached without disturbing any other part; anti-friction Hyatt or Timken bearings on every shaft; dust-proof construction, which extends to the bull gear and the bull pinion, which are inclosed in a dust-proof housing and run in oil; special adaptability for belt work.

The new model Lauson tractor is of the four-wheel type and is rated at 15 hp. on the drawbar and 25 hp. on the belt, but the engine will develop at least 20 per cent greater power, it is claimed. It weighs 5550 lb. without fuel, water, oil and lugs, distributed two-thirds on the drive wheels and one-third on the steering wheels. It has a plowing speed of 2½ m.p.h., a low speed of 1¾ m.p.h., and a reverse. It will pull three 14-in. bottom plows under average conditions, and four under favorable conditions, and has belt power capacity for the largest sized silo filler or a grain separator up to 30 in. cylinder. It sells for $1,800.

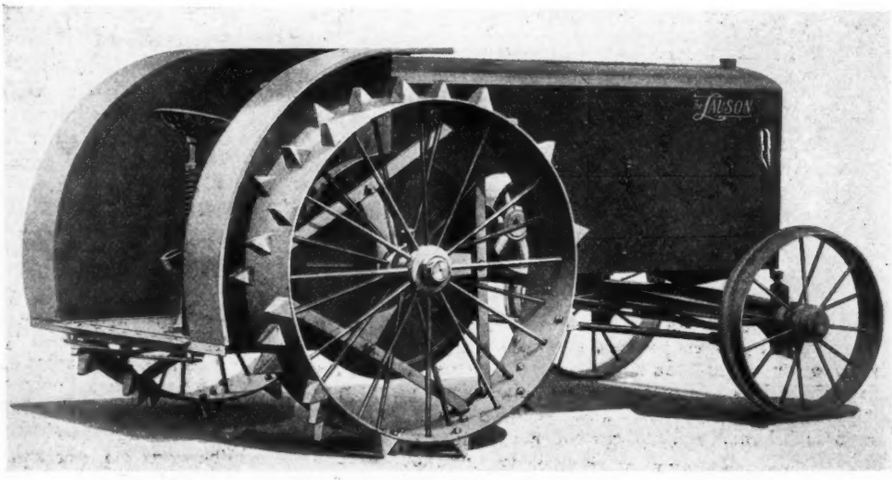
Unit assembly and accessibility of parts are emphasized in the construction. A Clark flexible universal coupling is interposed between the engine and transmission, so that either of these may be removed without interfering with the other. Unit construction in the differential prevents the possibility of spreading. The differential unit is an integral part of the transmission. The bull pinion shaft is splined so that it can be drawn out, making the differential unit removable. The cylinder head of the engine is readily removable, giving access to the cylinders and facilitating the grinding in of valves. The lower half of the crankcase has a plate at the bottom.

In all 24 sets of anti-friction Hyatt and Timken bearings are used, and reference to this bearing equipment is made in the name Full Jeweled. The rear axle is equipped with heavy duty Hyatt roller bearings, while the front wheels have dust-proof hubs and Timken roller bearings. All shafts in the transmission have Hyatt roller bearings, and the fly-ball governor is mounted on ball bearings. The connecting-rod bearings are brass backed and have four bolts.

All working parts are thoroughly protected against dust and dirt. The bull pinion and bull gear are inclosed in a dust-proof case with felt ring joint and run in oil. The fly-ball governor, of the company's own design, is an integral part of the engine, is inclosed in a dust-proof case and also runs in oil. It is driven direct from the camshaft, thus obviating the necessity of a governor belt. As an additional precaution against dirt the engine, transmission case and fuel tanks all are covered with an automobile type hood. When the transmission is thrown into neutral, belt power can be obtained by letting in the clutch.

Lubrication is by pump which automatically oils all bearings and gears, including the governor and cam bearings. Oil is forced to the crankshaft bearings by the pump under 30 lb. pressure and passes through ducts bored in the cheeks of the crankshaft. This force feed lubrication system is supplemented by the ordinary splash system.

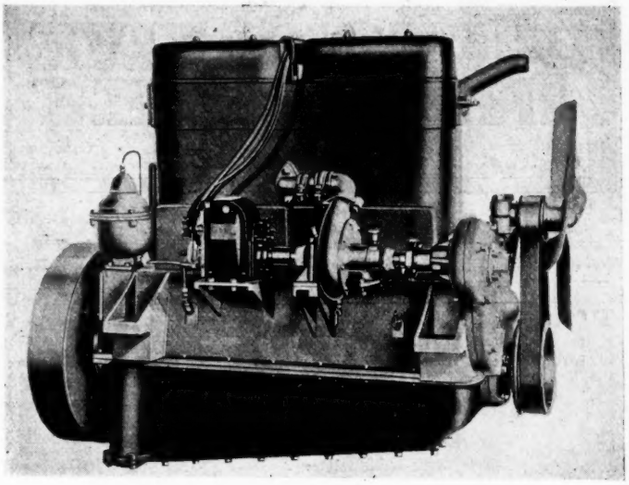
Gears are of hardened chrome nickel steel. Bull pinions are of steel and bull gears of semi-steel, all machine cut. The bull gear has 3½-in. face.



The Lauson tractor, showing complete inclosure of mechanism

The drawbar hitch is of standard height, 17 in., and a stationary drawbar is used for plowing, thus providing the approved hitch when two wheels run in the furrow. For harrowing and other work a swinging drawbar is furnished.

Detail specifications of the Lauson Full Jeweled tractor not mentioned above are as follows: Engine, Lauson-Beaver, four-cylinder 4½ by 6, valve-in-head type. Ignition, Sumter-Dixie high-tension magneto with impulse starter. Carbureter, Kingston, with Bennett air cleaner. Radiator, Perfex honeycomb type, extra large. Clutch, internal expansion type with compensating yoke, controlled by operator from seat. Control, from spacious back platform, where operator has everything within easy reach. Transmission, selective sliding-gear type. Pulley, 18 in. diameter, 8-in. face, 475 r.p.m. Driver wheels, 54 in. diameter, 12-in. face. Front wheels 32 in. diameter, 6-in. face. Wheelbase, 86 in.; overall length, 136 in.; width, 74 in.; height, 62 in.; tread, 52 in.; road clearance, 11½ in.; drawbar height, 17 in. Turning radius, 20 ft. Capacity of fuel tanks, 13½ gal. for both gasoline and kerosene.



Lauson-Beaver engine

Book Reviews

The Automobile Storage Battery, Its Care and Repair, by O. A. Witte. Published by American Bureau of Engineering, Inc., Chicago.

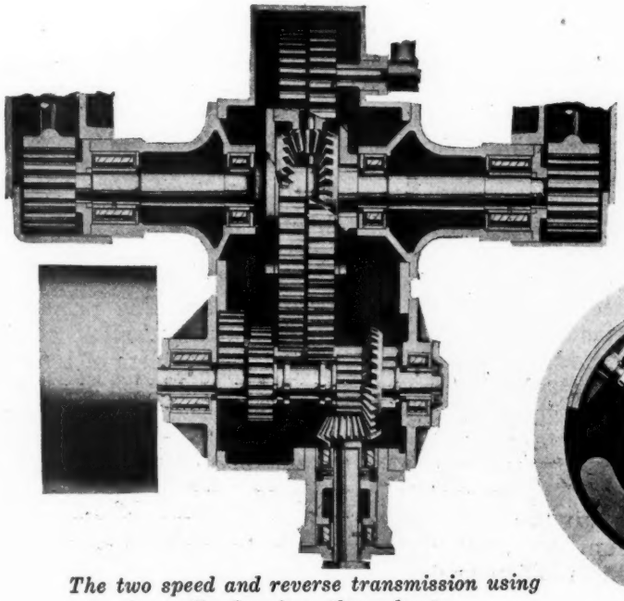
This book is confined to lead acid storage batteries for use on motor vehicles and is divided into two parts, the first part being a sort of text book on the subject of storage batteries and the second part a practical hand book dealing with the actual work of repairing and rebuilding batteries. The author states that much of the material for the text in the second part was furnished by H. E. Peers of Topeka, Kan., who is a practical battery man and has been engaged in repairing and rebuilding batteries for many years. The book is of handy pocket form with flexible covers and contains nearly 300 pages. All of the instructions contained in the second part are based on practical experience. Throughout the book there are numerous illustrations, most of those in the first part being cuts furnished by manufacturers, while the majority of those in the second part were made from photographs furnished by Mr. Peers. The book is well written and contains a large amount of useful information on storage batteries. It should be of great help to those engaged in maintaining, repairing and overhauling batteries.

Machinery's Handbook, Fifth Edition. New York: The Industrial Press. Price, $5.

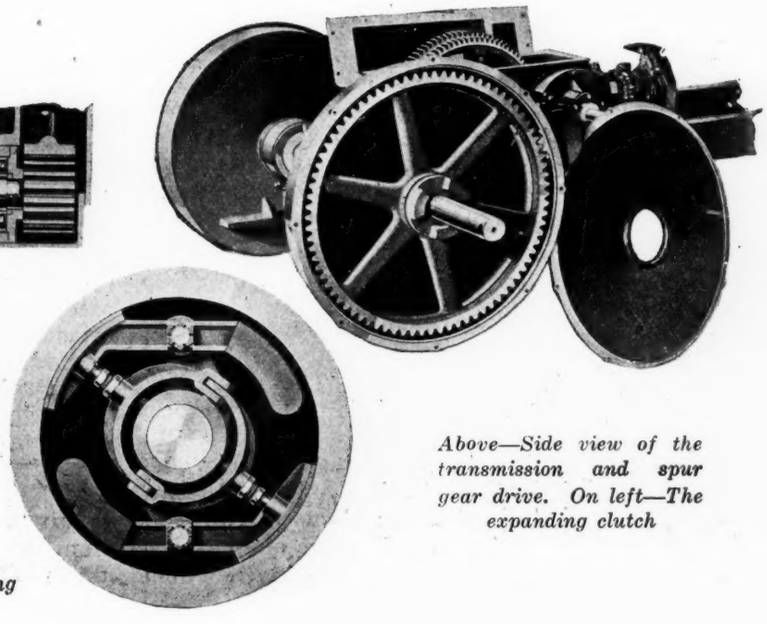
This well-known handbook is now in its fifth edition, of which there have been several printings, and we understand that more than 80,000 copies have been sold to date. The scope of the work is defined by the subtitle, A Reference Book on Machine Design and Shop Practice for the Mechanical Engineer, Draftsman, Toolmaker and Machinist. The first part of the book contains very elaborate mathematical tables, then follow sections on mechanics and the strength of materials and most of the rest of the work is devoted to standard machine elements and machine shop practice. The book is of the familiar pocket form, with flexible cover, and contains 1400 pages of text. To properly judge a work of this kind one really has to use it for a couple of years. It gives, however, the impression of covering a limited field and covering that thoroughly. The illustrations and typography are especially good.

—

A LIST of Books on Automobiles and Motorcycles, compiled by Arthur R. Blessing, C. A., D. L. S., Assistant Librarian, Public Library, Washington, D. C., has been published by the H. W. Wilson Co., New York. It is intended to be a complete and comprehensive bibliography of automobile book literature; to include all books on the subject printed in the English language and a few of the most important ones in France and Germany. The titles are arranged under subject heads in alphabetical order. The price of the pamphlet is 25 cents.



The two speed and reverse transmission using roller bearings throughout



Above—Side view of the transmission and spur gear drive. On left—The expanding clutch

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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Automotive Industries-The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Aviation Publicity

THE Pullman Smoker Philosopher, taken collectively, is a powerful individual. He boards the train at New York saturated with the gossip of his fellow philosophers, naturally strongly tinged with the flavor of the financial district. At the national capital another of his kind steps aboard the same train, fresh from the equally inspiring zone of departmental activity. Naturally enough this prominent intersection of Wall Street and Pennsylvania Avenue is bound to be the scene of much traffic—in ideas and opinions. At Chicago the two are joined by the man from Detroit and the triumvirate is complete.

Each of these three men perhaps has been wrapped up in affairs in his respective center, New York, Washington and Detroit. They have each formed the opinions characteristic of their respective environments.

When they meet, naturally enough the big question of the participation of this country in the war comes up. "What about the airplane program?" is the first question that is asked. Each one is full of information gathered in his own locality, but none knows what has been going on elsewhere. Each naturally believes everyone else possesses the same information that he does himself, but when the results are compared, owing to the disparity of opinion, disappointment and consternation are sure to result. The same thing has taken place on a large scale throughout the country. The New Yorker has heard the story of 100,000 airplanes darkening the sky.

The Washington man knows of the appropriations. He knows of the big undertakings of the Signal Corps, the Navy Department and the civilian airplane bodies. He sees the optimism reflected in the words of these men and, being a civilian, he is almost sure to come to inaccurate conclusions.

The Detroiter perhaps owns a factory producing airplanes. He knows what he has had to go through in getting tool designers, tool makers, machines, jigs, fixtures, factory space, corrections on Government blueprints, specifications on materials, freight shipments, and what not. He congratulates himself on making remarkable progress, and he has been too busy to read the Sunday Magazine Section with its fanciful clouds of airplanes.

The "Why" is not hard to find. It is simply short-sighted censorship. The answer is also easy: Intelligent publicity, authentic news presenting real facts. Remove the obscurity of a short-sighted censorship which sets afoot gossip and hearsay and arouses both false hopes and false apprehensions.

Variable Pitch Air Propellers

ADVICES have been sent out from Washington to the effect that the National Advisory Committee on Aeronautics is looking for a steel air propeller of variable pitch, and is directing the attention of inventors and designing engineers to the problem.

Considerable work has been done in the past on variable-pitch propellers in connection with motor boats, but since the introduction of multi-cylinder engines of considerable flexibility in marine work this development has practically ceased.

A variable-pitch air propeller would permit of so adjusting the propeller that its power absorption curve crosses the engine horsepower curve at the peak. Under these conditions the engine develops its maximum horsepower and produces the greatest airplane speed on climb.

It is surprising that wood propellers are still used, which have to be laboriously glued up of the best kinds of hardwood, turned and worked down by hand to templates. A hollow-steel propeller would seem to be a much better manufacturing proposition. As regards centrifugal strains, alloy steel would be superior to wood and the problem of twisting strains in the blades probably could also be satisfactorily met. Steel would seem to offer particular advantages for three and four-blade propellers. By pressing the parts of the blades in dies any form could be accurately reproduced, and in smoothness of surface and consequently in lowness of skin friction, the steel propeller could be made superior to the wood propeller.

Our Duty in Foreign Trade

By David Beecroft

IN order that we may secure the necessary quantity of raw materials from other lands which our industrial life requires, it becomes an almost imperative duty that we develop our individual foreign business to the maximum.

In doing this we are working for our permanency as a nation and at the same time contributing to the stability of our own business and incidentally to that of our industry.

To do this we must be rational in giving the foreigner what he wants in our products. A case in point is that of fitting the magneto for ignition to cars intended for use in certain countries that are backward as manufacturing nations and thinly populated.

It has been demanded, and it is still being demanded for remote sections of these countries. There are remote areas in Argentina, Brazil, Australia and South Africa where large fields of sales could be tapped with reduced resistance if our manufacturers would give some consideration to the local demands.

A few weeks ago one of the largest importers of Australia on a visit to this country offered to open a new field of sales for an American line if the maker would only give magneto ignition for that field.

In the populated sections of Australia, where electric lighting and starting are insisted upon, these calls are not heard, as these sections are prepared to give the same battery service which we enjoy in the U. S. A.

Letters received from South Africa last week tell how certain makes of U. S. A. cars that are fitted with magnetos are selling in the more remote sections.

There are places in the level interior of Argentina where our cars are hundreds of miles from garages and service depots. In those sections starting and lighting are not essentials, and the maintenance of battery equipment involves the greatest difficulty, as it is impossible to secure distilled water for the battery.

We need trade with Argentina because we must have its hides, its grains, its meats, its quebracho and some other products. True, we have Argentina's trade to-day, but we cannot take much credit for having acquired trade when our rivals were driven out of the market by war.

We have not had to win that trade—it came to us—but when the war is over we will have to hold it, and to retain it we must give those buyers goods that local conditions in their land demand.

It is true that differences in foreign models as compared with domestic ones cut down production and increase cost, but let us be careful that these added costs are not overbalanced by the increased sales resistance that we are building up in foreign lands.

We must learn to differentiate more with regard to the automotive apparatus needed in foreign lands. We must do this not only in the goods, but in the package and shipping of them. At first we are inclined to treat all foreign trade alike, but as we learn of the different countries we begin to give special treatment to meet special needs of different localities.

A case in point is that of shipping automobiles and accessories to South America. We must pack better for the west coast because there are few good harbors, the boats cannot dock as they do on the east coast, but must unload a mile to sea on lighters. If it is raining, goods may be spoiled by moisture unless specially well packed.

There is more pilfering along the west coast, and so better crating and packing are needed, as poor work is an invitation to thieving. The west coast has no storage facilities, and often goods remain outside uncovered for several days.

All is different on the east coast, with its protected harbors, its modern wharves, its modern power unloading cranes, its adjacent railroad tracks and its long storage warehouses.

Here an inferior grade of crating and packing as compared with the west coast will suffice.

So throughout the export field we must study those foreign lands, each a study in itself.

Latest News of the

To Clarify Airplane Situation

When Overman Bill Is Passed, Ryan Will Have Complete Executive Control

WASHINGTON, May 1—Until the President signs the Overman bill, which has been passed by the Senate and is now before the House, the airplane situation will not clarify as it should. Until this bill passes and receives the President's signature, John D. Ryan, the new head of the Aircraft Production Board, finds himself practically in the same boat as Howard E. Coffin, namely, occupying an advisory position, and without that necessary power which the reorganization has in mind. The House may pass the bill at any moment, and after that there is little question but that the President will lose no time in affixing his signature.

The failure of the aircraft situation to-day, in that it has conferred on the aircraft head only advisory powers, is shown in the following extract from the original law under which the Aircraft Board was created. Section IV of the original law stated:

"that the Board is hereby empowered under the direction and control of and as authorized by, the Secretary of War and the Secretary of the Navy, respectively, on behalf of the Departments of War and Navy, to supervise and direct in accordance with the requirements prescribed or approved by the respective departments, the purchase, production and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith and accessories and materials therefor, including the purchase, lease, acquisition or construction of plants for the manufacture of aircraft, engines and accessories; provided, that the Board may make recommendations as to contracts and their distribution in connection with the foregoing, but every contract shall be made by the already constituted authorities of the respective departments."

To overcome the present shortages of power and to grant Mr. Ryan a complete executive control, the President has offered the following amendment to the Overman bill, which is to authorize the President to consolidate executive bureaus and to grant them wider powers. The amendment which is placed in the Overman bill, and which has been accepted by the Senate, is

"That the President is further authorized to establish an executive agency which may exercise such jurisdiction and control over the production of airplanes, airplane engines, and aircraft equipment as in his judgment may be advantageous and further, to transfer to such agency for its use, all or any moneys heretofore appropriated for the production of airplanes, airplane engines and aircraft equipment."

The complete Overman bill, not including the above amendment, is as follows:

A bill authorizing the President to coordinate or consolidate executive bureaus, agencies, and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government.

Be it enacted, etc., That for the national security and defense, for the successful prosecution of the war, for the support and maintenance of the Army and Navy, for the better utilization of resources and industries, and for the more effective exercise and more efficient administration by the President of his powers as Commander in Chief of the land and naval forces, the President is hereby authorized to make such redistribution of functions among executive agencies as he may deem necessary, including any functions, duties, and powers hitherto by law conferred upon any executive department, commission, bureau, agency, office, or officer, in such manner as in his judgment shall seem best fitted to carry out the purposes of this act, and to this end is authorized to make such regulations and to issue such orders as he may deem necessary, which regulations and orders shall be in writing and shall be filed with the head of the department affected and constitute a public record: *Provided*, That this act shall remain in force during the continuance of the present war and for one year after the termination of the war by the proclamation of the treaty of peace, or at such earlier time during the said year as the President may designate: *Provided further*, That the termination of this act shall not affect any act done or any right or obligation accruing or accrued pursuant to this act and during the time that this act is in force: *Provided further*, That the authority by this act granted shall be exercised only in matters relating to the conduct of the present war.

Sec. 2. That in carrying out the purposes of this act the President is authorized to utilize, coordinate, or consolidate any executive or administrative commissions, bureaus, agencies, offices, or officers now existing by law, to transfer any duties or powers from one existing department, commission, bureau, agency, office, or officer to another, to transfer the personnel thereof or any part of it, either by detail or assignment, together with the whole or any part of the records and public property belonging thereto.

Sec. 3. That for the purpose of carrying out the provisions of this act, any moneys heretofore and hereafter appropriated for the use of any executive department, commission, bureau, agency, office, or officer shall be expended only for the purposes for which it was appropriated under the direction of such other agency as may be directed by the President hereunder to perform and execute said function.

Sec. 4. That should the President, in redistributing the functions among the executive agencies as provided in this act, conclude that any bureau should be abolished and it or their duties and functions conferred upon some other department or bureau or eliminated entirely, he shall report his conclusions to Congress with such recommendations as he may deem proper.

Sec. 5. That all laws or parts of laws conflicting with the provisions of this act are to the extent of such conflict suspended while this act is in force.

Upon the termination of this act all executive or administrative agencies, departments, commissions, bureaus, offices, or officers shall exercise the same functions, duties, and powers as heretofore or as hereafter by law may be provided, any authorization of the President under this act to the contrary notwithstanding.

It will be noted that this amendment included in this bill will allow Mr. Ryan complete and absolute control of the production, including placing of contracts.

(*Continued on page* 882)

War Corporation Organized

$500,000,000 Government Company Will Aid in Financing War Industries

WASHINGTON, D. C., May 1—The first step has been taken in the organization of the $500,000,000 Government War Finance Corporation, which is considered to be one of the most important developments in the financial history of the country, and which is being formed for the purpose of aiding in financing essential war industries. The President has named four directors who, with Secretary McAdoo, will conduct the corporation. These directors are: W. P. G. Harding, Governor of the Federal Reserve Board; Allen B. Forbes, New York; Eugene Mayer, New York; Angus W. McLean, Wilmington, N. C.

The corporation will start business with a capital stock of $500,000,000, subscribed entirely by the Government and with authority to issue up to $3,000,000,000 in bonds with which to finance its operations. Loans may be made to banks or trust companies of sums amounting to 75 per cent of the face value of loans made by the banks to any business "whose operation shall be necessary or contributory to the prosecution of the war."

Direct loans to essential industries or businesses may be made if in the opinion of the directors such advances are necessary. In such cases 125 per cent collateral is required. The total amount which can be loaned by the corporation direct to businesses is limited to 12½ per cent of the corporation's total capital stock and outstanding bonds.

An important part of the corporation is what is termed its Capital Issues Committee, which consists of seven men and which will have authority to pass upon new issues of stock amounting to $100,000 or more. The committee will not have power to forbid issuance of securities not approved by it, but under the system built up by the Federal Reserve Board it will be virtually impossible for corporations to float issues without first obtaining the committee's consent.

The War Finance Corporation already has obtained quarters in the Treasury Building, and as soon as the directors are confirmed by the Senate they will establish the corporation on operating basis, and indications are that it will be ready to make loans within two or three weeks. A number of informal applications for advances already are on file.

Automotive Industries

Automotive Matters Unsettled

Motor Transport Still Lacks Head—Railroads Refuse Truck Part Shipments

WASHINGTON, April 30—Events as regards automotive matters are distinctly unsettled here at present, with possible clearing up of the uncertainties in the next week. In the airplane field the appointment of John D. Ryan has not yet tended to clarify the situation. Mr. Ryan intends to proceed slowly until he is thoroughly familiar with conditions. Public curiosity as to the disposition of the officers in the Signal Corps connected with aviation will also have to await another week of conference.

At present it appears that Col. E. A. Deeds, Col. Vincent, Major Marmon and other officers formerly in the industry, and recognized as airplane experts, will be retained in their uniforms and transferred to the new corps to be organized by General Kenly. The new corps will operate as any other division of the army, probably taking the name of Aviation Department. It will deal to some extent with production, but be mainly devoted to turning out aviators and operating the airplanes.

Howard E. Coffin has already left Washington for an extended visit to his Southern estate. It is reported in authoritative circles here that Mr. Coffin will likely return to this city to take up important airplane work in a few months. The highest praise of his accomplishments up to this time is sounded here.

Truck Situation Muddled

The truck situation is in more of a muddle than ever. General Baker, who has been in charge of Q. M. trucks, after being appointed a colonel received a transfer to Chicago, where he will operate under General Barry in the Quartermaster Department. No one has yet been appointed in his place, and the motors division of the Quartermaster Corps is now without a head, as is also the new position of Chief of Motor Transport Service, which was created by the recent general order pooling truck purchases.

The confusion is general. H. L. Horning, chairman of the Automotive Section of the War Industries Board, does not know how he will work with the new truck division. Mr. Horning represents the last word on truck purchases for the Allies and the United States Army and Navy, as he is the automotive representative of the Requirements Division of the War Industries Board, which was recently appointed to pool all military purchases under one head.

Further, there seems to be misunderstanding as to the status of the truck industry in general. Makers are complaining that they are unable to secure parts, as the railroads refuse to accept them for shipment. Truck makers have been under the impression that their status as members of a very essential industry was settled here in Washington's official circles, but the impression is incorrect.

Truck Makers Must Prepare

While the passenger car industry has been quite definitely fixed in official minds as an important industry, the truck makers have never to this time had to bring their status up for discussion. They will find when that time comes that many opponents to the industry exist here. They will find that such work as Roy Chapin is performing is going to be of great value for settling the status of the industry as a war need. They will also find it extremely profitable when they come to plead for railroad priorities, as they will soon be forced to do if present complaints form the real conditions, to come armed with the facts showing just how important motor trucks are to both the industrial and military establishments.

—

Reorganize Bosch Personnel

NEW YORK, May 2—The personnel of the Bosch Magneto Co. has been completely reorganized, and the company, which last week was taken over by the government through the agency of the Alien Property Custodian, is to continue and plans a considerable expansion of its magnetic business. The new officers are: President, Joseph H. Bower, New York; vice-president, Christian Girl, Cleveland; treasurer, George A. McDonald, New York; secretary, William G. Fitzpatrick, Detroit; assistant treasurer, A. D. Altree, New York; general manager, A. T. Murray, Allentown, Pa.

Indication of pending developments in the company was given late last week when the Bosch company sent out a letter stating that it intended to continue its business and ship unfilled orders. The induction of the new officers makes plain how the work of the company is to be continued. Only the Springfield plant is to be operated, and there is at present a force of about 800 men at work. This may be increased in the near future. The present activities of the company are centered almost entirely upon the production of magnetos, only a small percentage of the output being used by the government.

Accessories Boost Airplane Cost

Navigating and Aeronautical Instruments Add $350—List of Appliances

WASHINGTON, May 2—The job of manufacturing airplanes comprises many more operations than merely the design and manufacture of the engine and plane. It includes the invention, design, purchase, procurement and manufacture of numerous accessories and appliances which are as vital to airplane efficiency as the plane or the engine. The average cost of a set of navigating instruments for a plane is $350.

Before an airplane can be put into military service it must be equipped with nine or more delicate aeronautic instruments, some of which are absolutely essential to exact flying, and all of which contribute to the successful operation of a plane. Without them a pilot would soon lose his location as to height and direction; he would not know his speed through the air, the speed of his propeller, the amount of gasoline in his tank, the temperature of his cooling water, or if his oil was circulating. He could not tell whether he was banking properly on his turns. These comprise the necessary flying instruments, but an aviator could not fly to any great height without another valuable instrument, an oxygen supplying apparatus, nor could he operate his guns, signal headquarters, release his bombs, or "shoot" his cameras without additional mechanisms.

All these instruments must be ready for installation on the airplanes as soon as they are assembled, for no plane is complete without them. In some instances, particularly for the two-seaters and the heavy bombing machines, two and even three instruments of each sort are necessary, totaling sometimes as many as twenty-three, but for ordinary work only about nine of them are needed.

For operation of actual combat planes, such as observing, photographing, bombing and fighting planes, many other complicated and expensive instruments and sets of apparatus are necessary. Among them are: Machine guns, gun mounts, synchronizers, bomb racks, bomb dropping devices, bomb sights, radio, photographic, and oxygen apparatus, electrically heated clothing, lights and flares. The cost of such additional accessories would bring the total cost of equipment for a plane to several thousand dollars each, depending upon the type of plane. But these devices will not be discussed in detail here.

The Signal Corps is purchasing practically all the purely navigating instruments and selling them at cost to the manufacturers of the airplanes as they are needed to meet the actual output of planes. This provides one purchasing center and prevents the various airplane companies and the Government from competing against one another, creating disorder and confusion among the instrument

(*Continued on page* 891)

Balance Sheet of the World War

Nations	Estimated Wealth	Debt Aug. 1, 1914	Per Cent	Debt Jan. 1, 1917	Per Cent	Debt April 1, 1918	Per Cent
Great Britain and Ireland	$90,000,000,000	$3,500,000,000	3.9	$18,000,000,000	20.0	$29,000,000,000	32.2
France	65,000,000,000	6,600,000,000	10.1	16,000,000,000	24.6	24,000,000,000	37.0
Italy	25,000,000,000	2,800,000,000	11.2	4,800,000,000	19.2	8,000,000,000	32.0
Total Allies	$180,000,000,000	$12,900,000,000	7.1	$38,800,000,000	21.5	$61,000,000,000	33.9
United States	260,000,000,000	.....	7.1	1,200,000,000	0.46	11,000,000,000	4.2
Total Allies to-day	$440,000,000,000	.....	...	.....	...	$72,000,000,000	16.3
Germany	$84,000,000,000	$1,200,000,000	1.4	$15,500,000,000	18.4	$27,000,000,000	32.1
Austria-Hungary	35,000,000,000	4,000,000,000	11.4	8,500,000,000	24.2	20,500,000,000	58.5
Total Huns	$119,000,000,000	$5,200,000,000	4.3	$24,000,000,000	20.1	$47,500,000,000	40.0
Balance in favor of (H) Huns or (A) Allies			(H) 2.8	.....	(H) 1.4	.....	(A) 23.7
At end of Napoleonic war, 1805-1814: Great Britain	$11,500,000,000	$4,300,000,000	37.5				

Before the World's Salesmanship Congress in Detroit last week, Norval A. Hawkins, sales manager of the Ford Motor Co., who used to be an accounting expert, presented an analysis of the assets and liabilities of the Central Powers and the Allies, as shown in this table. The relation of war debts to the resources of the country are given in figures and percentages, showing how alarmingly the liabilities of the Hun nations are approaching the assets. He stated that American business must go on if we are to avoid spending our capital instead of our income in the great business of war.

Business Must Continue During War

World's Salesmanship Congress Finds Business Men in Favor of Greater Commercial and Industrial Activity for War Success

DETROIT, April 27—That business must be increased, not decreased, if America is to win the war was the sentiment of the third annual World's Salesmanship Congress which met here this week. Nearly 50 speakers echoed this sentiment. The speakers represented many trades and professions, both practical business men and professors of economics.

The handling of the nation's business by the government was mentioned by several speakers and the congress applauded vigorously the assertion that we must during the remainder of the war and the peace period that follows have more business men in politics and fewer lawyers and politicians. Mention of the activities of such men as Hurley and Schwab brought cheers on every occasion.

The mental attitude of the people was discussed as one element of national strength, and it was urged that the public should not be thrown into a state of pessimism by unwise and unnecessary disturbance of business, although all agreed that the war program must be given the fullest support at every point.

Advertising must be continued even though there be absolutely nothing to sell, one speaker said, if the manufacturer does not wish to lose the good will which he has built at a great cost.

Over-optimism was deprecated as one of our dangers. Several of the speakers said we could do much harm to ourselves by thinking the situation too rosy and that we might thereby be lulled into a security which would be upset by the earnest efforts of the Central Powers.

Greater harmony between capital and labor was declared a necessity. One speaker asserted that the relationship must be more on a fifty-fifty basis and that labor must be assured a fair interest in production.

A New Zealand speaker told of the extent to which business has increased in that country during the war. He urged business men to effect economies such as using trucks in place of horses and installing office appliances. He said it was a question of doing more work and not less.

E. LeRoy Pelletier, well known as an advertising man in the automobile trade, summed up much of the sentiment when he said, "You cannot finance a war out of a war."

One session devoted to advertising passed a resolution urging the repeal of that part of the War Revenue Bill which would require all national publications, such as AUTOMOTIVE INDUSTRIES, to pay postage on a parcel post zone basis, thereby doubling the price and more to readers in the west and far west. The Congress also passed a resolution urging a change in the Sherman Anti-Trust Law, which, the resolution stated, is out of date, has never been used for the purpose for which it was intended and serves to demoralize rather than benefit business.

Speakers from the automotive industries included Norval A. Hawkins, sales manager of the Ford Motor Co.; Commissioner William M. Webster of the National Association of Automobile Accessory Jobbers; E. LeRoy Pelletier, advertising counsel; W. K. Rutherford, sales manager of the B. F. Goodrich Co.; F. B. Caswell, sales manager of the Champion Spark Plug Co; L. C. Rockhill, sales director of the Goodyear Tire & Rubber Co.

Inland Waterways Transportation Solution

Development Would Cost Money, But Would Provide Vital Means of Access to Country's Grain, Fuel and Manufactures

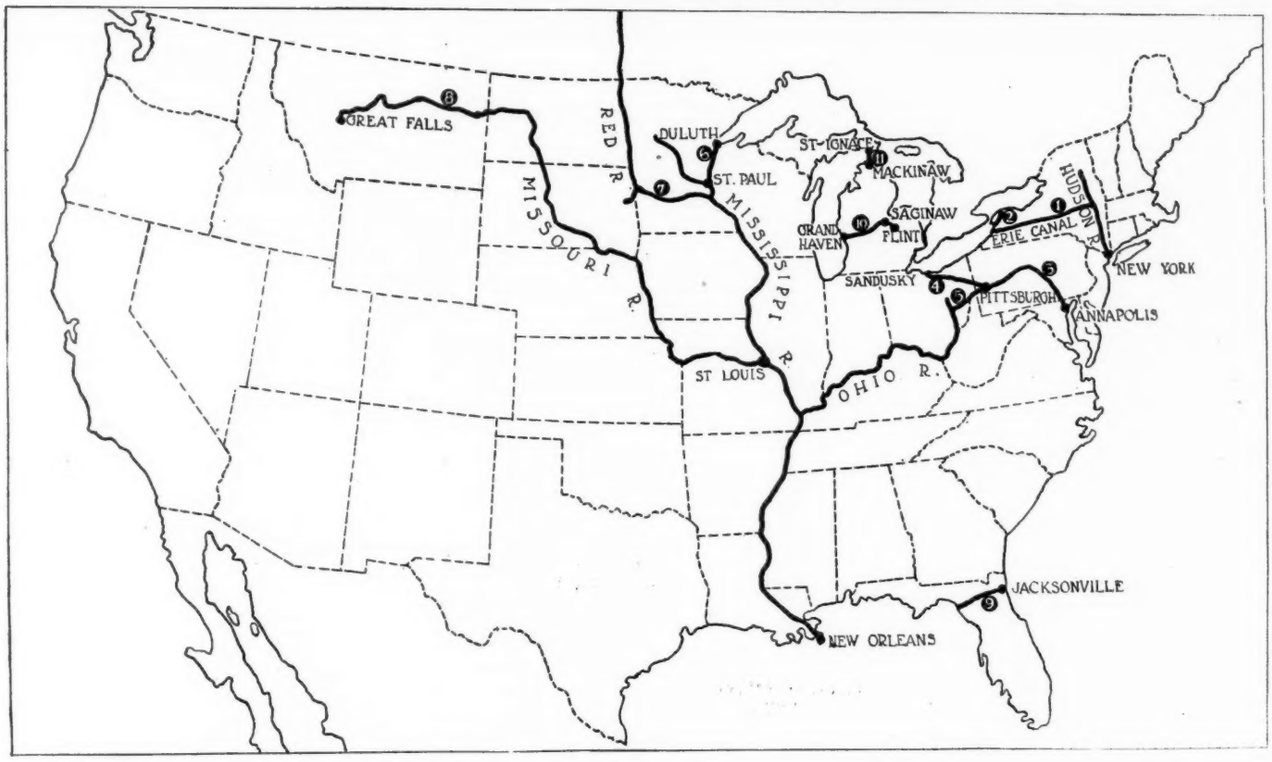
DETROIT, April 25—Development of inland waterways was held to-night to be a solution of our transportation problem by Horatio S. Earle, president of the H. S. Earle Mfg. Co., in an address before the World's Salesmanship Congress. He recommended certain waterway improvements, which would let ships into the grain fields of the Northwest, would let ocean vessels and battleships into the coal fields of Pennsylvania, and would provide a cheap and expeditious means of commerce between points that are today operating under an enormous handicap. He said:

"'Keep the home fires burning' is fine, and any man who is not for it is a traitor to this country; but it is also necessary to keep the fires burning under the boilers that supply the power to our factories until our boys put out the fires in the Krupp gun factories and the world power ambition fires of the Potsdam gang. In fact, we should do our utmost to keep all of the industries of this country, farming, mining, manufacturing, going as normally as possible, so that, when the boys who have fought the battles to make democracy safe the world around come home, they may be sure of a job at good pay.

"A million or more men will come home some day and will ask, 'What have you for us to do?' Are we going to answer, 'Nothing?' Yes! if we make as little preparation for them as we made for war. Then three million or more dollars loss per day will be the cost until we get the lock put on the barn, the doctor's prescription filled, and a roof put on the house.

"The national government and every state government should plan at once for the greatest canal, railroad and high-

Inland Waterways Our Transportation Solution



This map shows the general location of the inland waterways recommended by Horatio S. Earle before the World's Salesmanship Congress. The real course of such waterways is not, of course, indicated here, as that would have to be determined by surveys. The map merely shows the connection that would be made and the areas and resources that would be affected.

way system that has ever been dreamed of, that we may be prepared for war and prepared for peace. This should be a co-ordinate system, making a thorough survey of the entire United States, studying the possible needs for shipping crops from the farms, ores from the mines, wares from the factories, and everything needed in peace or in war to the points where these would be needed most quickly and at the least possible cost.

"The United States Congress should enact a law establishing a National Internal Improvement Survey Commission, appropriate for the expenses of such commission ten million dollars, authorize the President to appoint fifteen engineers, whose salaries should not be less than ten thousand dollars per year each, and their expenses. This commission should make a thorough survey of the whole United States and make reports to Congress as fast as conclusions should be reached.

"I am not going to commit myself as favoring any of the projects that I shall mention, but there is no question in my mind but that some of them are feasible and necessary, and some of them would be worth to the country many times their cost."

Project No. 1—Erie Canal from Lake Erie to the Hudson River, a 1000-ton barge canal to a 10,000-ton boat canal, so that enormous boats loaded with wheat at Duluth could unload at New York City, or proceed to Liverpool, Brest or any other ocean port.

Project No. 2—Erie-Ontario Canal, from Lake Erie around Buffalo to Lake Ontario, making it possible for our boats to go into Lake Ontario in our own waters; such a canal would furnish a drainage system for Buffalo, Niagara Falls, Lockport and Rochester, such as the Chicago drainage canal furnishes Chicago.

Project No. 3—A canal from the Atlantic soaboard at Annapolis, or some other ocean point, north into Pennsylvania to the bituminous and anthracite coal fields, thus making it possible to coal our war vessels and transports without using the over-burdened and under-able railroads.

Project No. 4—Canal from Sandusky, or some other Lake Erie port, to Pittsburgh, regardless of cost, so that the ore boats of the Great Lakes could unload at the steel mills, another relief to railroad transportation.

This project links up with my next.

Project No. 5—The improvement of the Ohio River from Pittsburgh to the Mississippi, to open another water highway from Detroit and the Great Lakes to the Atlantic Ocean, making it possible for us at Detroit to get West Virginia coal by an all-boat route.

Project No. 6—A canal from Duluth to St. Paul, connecting Lake Superior with the Mississippi River.

This would complete five routes from the Great Lakes to the Atlantic: Erie-Ontario-St. Lawrence route, Erie-Hudson route, Erie-Ohio route, Michigan-Chicago-Mississippi route, Superior-Mississippi route. Sounds good, doesn't it? Cost would be something, wouldn't it? It would be worth something, wouldn't it? But, I'm not through yet.

Project No. 7—Minnesota Canal, connecting the Red River of the north with the Mississippi, tapping the tremendous wheat fields of North Dakota and Manitoba by a railless and carless highway, making the sixth connection with the Atlantic.

Project No. 8—Improvement of the Missouri River from St. Louis to Great Falls, Montana, thereby getting timber, oats and wheat from Montana, wheat from North and South Dakota, wheat and corn from Nebraska and Kansas into the Mississippi by boat without killing a cow on the track or smashing an automobile at a railroad crossing, making the seventh connection with the Atlantic and with the world.

If these eight projects were made facts the distance from New Orleans to Baltimore, Philadelphia, New York and Boston would become a factor in transportation, to which our next project would be vital.

Project No. 9—A canal across Florida from the west side to Jacksonville.

Possibly you men from Michigan are thinking that I have forgotten our state, but far be it from my intention.

Project No. 10—A canal from Flint to Grand Haven, via Saginaw. Then Flint could ship her automobiles to the southland by several routes that are not untravelable and not damnable, but navigable, and could get coal on a return trip.

Project No. 11—A sunken bridge or floating tunnel, it is either one and both, from Mackinaw City to St. Ignace, making it possible to board a train in Detroit and proceed at good speed over an all-rail route to Houghton, Michigan, without going through some other state.

"Such a thing impossible? No, it is an engineering possibility! If you can build a boat 1000 ft. long, you can build twenty-five such boats 30 ft. in diameter,

all round; you can attach them end to end, can whirl one end at the Mackinaw City shore, the other end at the St. Ignace shore, let the air out and let the water in. It will sink. Make your approaches at both ends and your air stacks at different points, pump out the water, and you have a floating tunnel or a sunken bridge that is cheaper to build than a tunnel underneath the water or a bridge above it.

"I have an idea that all of these improvements could be made at less cost than this war in which we are now engaged. We had to fight this war or we would have had no country. The boys who are fighting it and preserving it for us and for our children are worthy of a job to do at good pay when they come home. Such improvements would create business for all of our industries, especially shipbuilding; all of which would help us to prepare for war and peace."

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M. A. M. A. Refuses Sanction for Chicago Shows

CHICAGO, May 1—A letter has been sent out by the Motor & Accessory Manufacturers' Assn. to its members saying that the organization had refused to sanction the exhibition of the National Assn. of Automobile Accessory Jobbers here, but would take jurisdiction over it. This may be interpreted as meaning that members of the M. A. M. A. who exhibit in the N. A. A. J. show at the Coliseum may get in trouble with their organization. Commissioner Webster of the jobbers' association said that sanction had not been asked for, and that applications for space had been received from several M. A. M. A. members.

Sanction for the show of the National Assn. of Accessory Exhibitors to be held at the Municipal Pier was also refused. This show seems to have the hearty support of the city, as evidenced by the fact that the City Band has been offered gratis, and that Lucius Teeter, president of the Assn. of Commerce, has been appointed chairman of a committee to arrange for a series of conventions to be held during show week.

F. Ed Spooner, Detroit, has been put in charge of arrangements for truck exhibits, and Guy Hall, Kansas City, will probably head the tractor committee. Not only accessories, but trucks, tractors and other automotive apparatus will be shown at the Municipal Pier.

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General Kenley Flies to Aviation Camp

NEW YORK, April 30.—Brig.-Gen. W. A. Kenley, recently appointed chief of the Division of Military Aeronautics, has been flying from one aviation camp to another for inspection purposes, as well as to familiarize himself with existing conditions and to test the flying qualities of airplanes. Yesterday he made a non-stop flight from Washington to Mineola, Long Island, in a four-passenger 450-hp. Caproni biplane in 3 hr. 15 min. He was accompanied by his son, Lieutenant Kenley; Capt. Silbio Resnati, the Italian aviator, who acted as pilot, and Capt. Hugo d'Annunzio, the reserve pilot.

Cut Rubber Imports 37½ Per Cent

War Trade Board To Limit Importation to 25,000 Tons In 3-Month Period

WASHINGTON, May 2—The War Trade Board has placed crude rubber on the restricted import list, effective May 1. This has been done primarily as a means to conserve tonnage and under the rules of the board the amount of rubber for which licenses will be issued is to be limited to 25,000 tons in a three-months period which represents a reduction of 37½ per cent over average monthly shipments of late. No date has been set as yet when this three-months period is to begin but it is expected the date will be set within the next few days. In other words if the date is set as of May 5, for example, licenses will be issued for the importation of crude rubber from overseas points for not to exceed 25,000 tons within the following three-months period.

Charles T. Wilson, chairman of the committee representing rubber importers, states that the limitation will amount to a restriction of about 37½ per cent in the quantity of rubber coming in. During January, February and March, 1918, the total amount of rubber imported was 46,353 tons. During the entire year of 1917 the total importation amounted to 167,062 tons, which represented an increase of 43 per cent over the tonnage imported in 1916.

Reports have become current that rubber mills will be requested to devote a considerable proportion of their production facilities to the manufacture of rubber footwear for the army. It is not clear exactly where this report originated. Rubber manufacturers, however, are not greatly concerned over it for the reason that only about 10 per cent of the rubber imported is used in producing footwear.

The production of tires takes about 70 per cent and the balance goes for mechanical devices and sundries.

The United States Rubber Co. is the largest producer of rubber footwear and this company together with the Hood Rubber Co. produces probably 90 per cent of all the rubber footwear consumed.

It is pointed out by rubber importers that any kind of rubber can be used for footwear, whereas certain grades are most suitable for tires; the use of these grades for footwear would be poor efficiency.

The transportation difficulties, which up to the present time have checked the receipt of rubber in Akron and other centers, are rapidly disappearing. Akron is receiving shipments quite freely from the Pacific Coast, where the bulk of the imports are received. It is stated that the principal rubber mills have good stocks on hand and that even if a partial embargo amounting to 20 per cent were placed on imports this would not compel an immediate restriction of output. The mills could run along for a number of weeks at their present capacities.

During 1917 the United States consumed 182,000 tons of rubber, which was about 71 per cent of the world's production of 257,000 tons. Of this total approximately 20 per cent was wild rubber, the balance being the plantation product. The production of plantation rubber has increased from about 2 per cent in 1907 to 30 per cent in 1917.

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British War Trucks Increase 43 Per Cent

LONDON, ENGLAND, April 16—The number of motor trucks in the possession of the British Army increased 43 per cent during the past year. In the same time the number of motor cars and ambulances increased 73 per cent. These figures are exclusive of the replacement of wastage.

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To Clarify Airplane Situation

(*Continued from page* 878)

This is in line with the suggestions made by the Marshall Committee, which, in its report, stated that airplanes, like ships, should be built by one authority and operated by another, and that the operating authority should not interfere with production. Following this plan, the President has appointed Mr. Ryan as the executive head of production, leaving W. C. Potter as the actual production manager, while Brig.-General Kenly will have complete and absolute charge of the training of aviators, which will be an entirely separate division from production.

The general impression in Washington is that there will actually be very little change in production plans and no change in engine design under the new aircraft régime. Many take the view that owing to the widespread Senatorial denunciations, the administration had to do something to appease the public mind and appointed Mr. Ryan, who will allow the original plans to proceed much along the route first laid out. It is felt that Howard Coffin made a serious error when he did not resign eight months ago. He should, according to those close to the problem, have refused to accept the chairmanship of the Aircraft Board when it was so organized last fall as to completely hamper his initiative.

Mr. Ryan appears to be profiting by past mistakes. He intends to have no publicity regarding aircraft activities. His only statement, following his first day at the offices of the Aircraft Board, was: "I know absolutely nothing about the airplanes or the airplane situation, so I cannot talk about it," an indication that we will not have the exaggerated airplane publicity of the past.

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Massachusetts to Keep Roads Clear

BOSTON, May 1—The Committee on Roads and Bridges has reported a bill authorizing the Massachusetts Highway Commission to spend $100,000 next winter in keeping the highways open for motor truck traffic. This work was neglected last year, due to lack of funds. The money appropriated will be taken out of the registration fees and fines, which now total more than $2,000,000 a year.

General Falling Off in Automotive Exports

Shipments Show Substantial Increase Over February Amount, but Are Still Below the Average for the Year

Mos.	Cars	Value	Trucks	Value	Parts
Mar.	4,246	$3,981,016	620	$1,526,387	$2,683,902
Feb.	3,551	3,078,191	765	1,917,638	1,962,979
		1917			
Mar.	5,755	$4,025,664	1,040	$2,961,389	$3,044,195

WASHINGTON, May 1—Exports of automobiles, trucks and parts during March amounted to $8,191,305, a substantial increase over the February amount, which was the smallest in years. The March amount is still below normal, being only 80 per cent of the total for March, 1917.

The value of the exports of cars, trucks and parts for the 9 months ending March 31, 1918, was $86,093,407, approximately the same as the total for the corresponding period a year ago.

If the value of the airplanes, motorcycles, gasoline engines, tires, magnetos and spark plugs exported is added to the March amount, the value of exports increases to $15,087,310.

During March, 1918, 620 trucks were exported as compared with 765 in February, and 1040 in March, 1917. Great Britain and France received 298 of these, and Canada 132. Passenger car shipments increased from 3551 in February and decreased from 5755 last March to 4249, the value of which was $3,981,016. South American trade decreased greatly. Argentina received only 79 cars, as compared with 335 in February. Chile's quota was 137, as compared with 191 in February. Trade with the Orient, on the other hand, increased. Australia received 248 cars, as compared with 144 in February. British India took none in February but 25 in March. Russia, of course, received none, and Norway only one.

During March 10,215 engines, including automobile, truck, marine, tractor, stationary and creeper-type gas engines, were exported. The value of these was $4,420,831, or the largest item in our exports. Tires exported during March were valued at $934,631 and magnetos and spark plugs at $318,333.

It is evident that instead of shipping whole trucks or cars, the tendency is to ship a greater amount of parts and engines.

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Munitions Plants Need Workers

WASHINGTON, May 1—The Department of Labor reports a shortage of skilled mechanics and toolmakers in munitions plants. About 10,000 skilled workers are required, and the shortage, it is stated, is cutting production for the Ordnance Department to 75 per cent. The Department of Labor has an enrollment of 220,000 workers on its Employment Reserve and will take workers from these if manufacturers of non-war materials cannot be induced by appeals to encourage their workers to enter the munitions factories.

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Canadian Registration Increases

TORONTO, ONT., May 1—Registration of automobiles in Ontario and Manitoba has shown a marked increase during the first 3 months of 1918. The number of licenses taken out in Ontario up to March 31 was 48,500, a gain of 10,000 over the corresponding period of 1917. There were 4616 chauffeurs licensed in Ontario during the same period, and 2000 licenses were given out for motorcycles.

In Manitoba 15,350 licenses were issued, or 100 per cent more than the total for the first 3 months of 1917. It is estimated that the 1918 registration will be 25,000, as compared with the 1917 registration of 18,000.

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Jackson Munitions Gets Large Order

JACKSON, MICH., April 30—The Jackson Munitions Corp. has received a Government contract for machining 1,000,000 75 mm. high explosive Mark L shells and 177,500 155 mm. high explosive shells. The latter will be handled exclusively by the Jackson Munitions Corp., but the order for the 75 mm. shells will be manufactured by the following sub-contractors: Jackson Automobile Co., Jackson Cushion Spring Co., Sparks-Withington Co. and the shell division of the Mott Wheel Works. Production on the 155's has started and it is expected that work on the 75's will be well under way within a few weeks.

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Canada to Tax Cars 10 Per Cent

WASHINGTON, D. C., May 1—Canada proposes to place a special war excise tax of 10 per cent on the selling value of automobiles imported into or manufactured in Canada and unsold on April 30. This proposal is included in the budget presented to the Canadian Parliament to-day by the Acting Minister of Finance.

Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for March and Nine Previous Months

	Parts for March and Nine Previous Months.				Months Ending March, 1918			
	1918		1917		1918		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	.....	.....	.....	.....	18	$192,620	24	$280,414
Airplane parts	.....	$965,213	.....	$371,524	.....	5,705,460	.....	1,602,887
Commercial cars	620	1,526,387	1,040	2,961,389	9,853	26,462,238	11,937	33,741,573
Motorcycles	1,105	256,997	2,122	432,416	7,984	1,739,867	11,486	2,298,520
Passenger cars	4,249	3,981,016	5,755	4,025,664	41,874	35,648,762	43,200	32,229,103
Parts, not including engines and tires	.....	2,683,902	.....	3,044,195	.....	23,982,407	.....	19,644,277
Magnetos, spark plugs, etc	.....	318,333	.....	.....	.....	2,608,501	.....	.....
Tires	.....	934,631	.....	.....	.....	9,512,232	.....	.....
ENGINES								
Automobile, gas	3,219	394,496	.....	.....	27,051	3,280,346	.....	.....
Marine, gas	520	263,958	.....	.....	6,195	1,903,555	.....	.....
Stationary, gas	2,873	331,157	.....	.....	19,317	2,215,046	.....	.....
Tractor and creeper-type gas engines	3,603	3,431,220	.....	.....	15,576	15,408,959	.....	.....
BY COUNTRIES NINE MONTHS ENDING MARCH, 1918.								
	Passenger Cars		Trucks		Passenger Cars		Trucks	
Argentina	79	49,520	.....	.....	2,954	2,096,292	.....	.....
Australia	248	177,723	.....	.....	3,386	2,614,717	.....	.....
British India	25	8,800	.....	.....	57	37,402	.....	.....
British South Africa	90	72,537	.....	.....	1,830	1,436,200	.....	.....
Canada	2,276	1,796,637	132	169,779	9,950	7,520,662	705	882,044
Chile	137	186,928	.....	.....	2,946	2,962,078	.....	.....
Cuba	129	218,406	.....	.....	2,498	2,468,412	.....	.....
Dutch East Indies	1	420	.....	.....	1,206	1,232,536	.....	.....
France	84	199,644	143	569,052	794	1,009,522	2,274	8,262,860
New Zealand	19	13,953	.....	.....	1,389	1,080,286	.....	.....
Norway	1	500	.....	.....	90	94,566	.....	.....
Philippine Islands	144	125,797	.....	.....	1,068	931,442	.....	.....
Russia in Asia	.....	.....	.....	.....	5	8,425	.....	.....
Russia in Europe	.....	.....	.....	.....	492	1,136,400	406	1,562,303
United Kingdom	190	486,628	155	507,288	885	1,916,323	4,632	12,833,864
Other Countries	826	643,523	190	280,268	12,324	9,103,499	1,836	2,921,167
Totals	.....	.....	620	$1,526,387	.....	.....	9,853	$26,462,238

Paris Limits Motor Car Trips

Essential Aspect of Car Makes Ruling Unreasonable—Opposition Is General

PARIS, April 3—To-day regulations were issued forbidding the use of private automobiles in Paris, declaring that no automobiles should pass beyond the city walls, and further stating that any car found beyond the zone limited by the belt railroad would immediately be confiscated by the military authorities.

The regulations are an ill-considered and impracticable attempt to arrest an imaginary evil. The private automobiles in service in Paris are practically all used for very important business and cannot be withdrawn without serious inconvenience to the nation. To close the gates of Paris against automobiles is an impracticable proposition. Further the choice of the belt railroad as the limit within which cars provided with passes shall operate is devoid of all reason. This belt railroad at some points is only three or four miles from the city walls; at other points it is twenty miles away. Thus in one direction all the suburbs can be reached. In another direction important suburbs of Paris are shut off to motorcars, although they are open to trolley cars, railroads and other means of locomotion.

When the new and drastic laws were published the general public imagined that Paris would immediately be swept clean of automobiles. There is no apparent difference in the number of cars on the streets. Taxicabs and motorbuses are running as usual. The central police offices are full of motorists claiming permits to travel by automobile. And the authorities will have to give these permits, for to refuse them would tie up national industries. If the authorities responsible for the regulations had taken the trouble to travel over the roads of Paris and suburbs they would rapidly have convinced themselves that joy-riding was non-existent and that no further reduction in the number of cars could be made without reducing the productive ability of the nation.

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France's Red Gasoline

PARIS, April 1—All military gasoline used by the French army will be tinted red from to-day onward, in order to prevent its getting into civilian hands by illegal means. A product has been found which will give it a distinctive color without injuring its qualities. In one of the army services at the rear red gasoline already has been tested with the result that the average consumption dropped immediately. This proved that not unimportant quantities of gasoline had been sold or given away to civilians. No person was found willing to have red gasoline in his possession.

For a considerable time now gasoline has only been supplied to those motorists who had absolute need of a car and who were expected to use the gas for a specified purpose. If, however, the gasoline thus delivered was employed for other purposes, the only punishment was to withhold further supplies. The officials have now authority to prosecute in the criminal court all persons who, having been supplied with gasoline for specific work of national importance, are found making use of it in their private interests.

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Deny Participation of French Racers

PARIS, FRANCE, April 28—Reports printed in American newspapers that Arthur Duray, Jean Chassagne, Albert Guyot, Rene Thomas and others will compete in speedway races are misleading. All these men are either in military service, or under military law, and cannot leave France. Should any of these racing drivers wish to compete in speedway races in America, the Automobile Club of France would permanently disqualify him from taking part so long as the war lasts.

Rumors that Duray, Chassagne, Guyot and Thomas have signed contracts to race in America with the Wellman-Pickens group this year are untrue. Not one of these drivers has ever received any communication or offer from the Wellman-Pickens organization.

There is also a scarcity of racing cars here. The only racing Peugeot in France at present is Duray's 1914 Baby-Peugeot, which has a cracked cylinder that cannot be replaced. There are two Fiat and two Sunbeam racing cars in Europe, but neither the Fiat nor Sunbeam company has any intention of sending them to America. Jack Scales, who had arranged to bring one of the Fiat cars to America last year, is with the American army as an expert on Fiat cars owned by the American Expeditionary Forces. His team-mate Fagnano is under military authority at the Turin factory.

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Dutch Embargo on Tin

WASHINGTON, April 30 — Holland has placed an embargo on the exportation from the Dutch East Indies of tin and tin ore, which are needed in large quantities by the United States. About 16,000 tons of tin were received by this country from the Dutch East Indies in 1917, equalling one-third of the total amount imported. Official notification of the embargo, effective April 22, was received on the 25th, and it was suggested at Washington that the measure is in retaliation for the American requisitioning of Dutch ships. It has also been suggested that this action was prompted by the critical situation in which Holland finds herself with Germany.

Steel manufacturers who have drawn extensively on Batavia for tin said yesterday that word had been received that metal already paid for would not be affected by the Dutch embargo, and would reach this country in due course of time. The embargo, it was said, has practically been in effect since the middle of March, due to transportation difficulties.

Kerosene Engine Tests

France Offers Prizes for Best Devices—Only French Types Eligible

By W. F. Bradley

PARIS, April 1—After a lapse of nearly four years the kerosene motor competition of the Automobile Club of France, abandoned at the declaration of war, will be held the first week of May. Three prizes of $10,000, $2,000 and $400 are offered for the most satisfactory automobile engines running on kerosene only. Gasoline can be used for starting, but no special tank must be necessary for this fuel.

Only French carbureters or appliances are eligible for these tests, although the engine used may be of foreign construction.

The density of the kerosene to be used is 810-820 with a minimum flash point of 35 deg. Cent. in Garnier apparatus.

The competition comprises both a laboratory and a road test. On the bench there will be a 3-hour fuel test at full load; a 3-hour fuel test at half load, at the same number of revolutions as for full load; a 2-hour fuel test at half speed, and finally a 2-hour fuel test at full speed without load.

Before the test the competitors will be allowed half an hour in which to prepare the engine and carbureter.

In order to qualify in this test the consumption must not exceed 350 grammes per horsepower-hour, and no motor must weigh more than 33 pounds per horsepower.

All motors qualifying in the preliminary test must be put back into their respective chassis and run in a road test a distance of about 600 miles in four days.

The weight of the car must be 2800 pounds minimum, without driver, fuel and oil. Disqualification will follow a lower average speed than 18 m.p.h., but no account will be taken of a higher average; speeding will be discouraged. A military officer will be placed aboard each car as observer.

The amount of fuel and oil consumed will be noted and will serve for the general classification. During the road test a small quantity of gasoline will be given to each competitor for starting purposes; no other gasoline will be allowed aboard.

Awards will be made on points, taking into consideration the consumption per ton-mile and regularity of running.

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Drilled Holes in Airplanes

CLEVELAND, April 27 — Charged with drilling holes in the wings of airplanes about to be delivered to the Government, an employee of a factory here was arrested by Federal agents yesterday. The machines were so damaged that they would have fallen had they been used in a flight.

Gasoline Production Increased 32% During 1917

Average Daily Increase Nearly 2,000,000 Gallons Over 1916—Crude Oil Output Increased 22%—Quantity of Kerosene Slightly Increased

WASHINGTON, D. C., May 1—During 1917 there was a 32 per cent increase in the production of gasoline or nearly 2,000,000 gal. per day more than in the calendar year of 1916, according to the latest figures of the Bureau of Mines. The daily increase in gallons over 1916 was 1,853,306.

That the increase in production is steadily gaining, and has been gaining during 1917, is indicated by the fact that the production of gasoline during the last 6 months of the year was much greater than during the first 6 months.

The gasoline production for the entire 1917 year was 2,729,712,033 gal. On a basis of 365 working days, this represents a daily production of 7,478,630 gal. In 1916 the daily production was 5,625,357 gal. The total increase in gasoline produced in 1917 as compared with 1916 is over 2,000,000,000, the exact figures being 2,058,880,596 gal.

At the same time that the production of gasoline was increasing 32 per cent the production of kerosene increased but 7½ per cent. The total quantity of kerosene produced in 1917 was 1,566,015,103 gal. as compared with 1,455,495,732 gal. in 1916. This represents a net increase of 110,519,731 gal.

While the production of gasoline and kerosene was increasing, the healthy condition of the crude oil situation throughout the country is indicated by a 22 per cent gain in production during the same period. The production of crude oil is given in barrels of 42 gal. each. For the year the production was 301,319,318 bbl. as compared with 246,992,596 bbl. in 1916. This represents an increase of 54,326,727 bbl.

Production of crude and distillates made greatest gains during the last six months of 1917. For example, 15,128,994 bbl. of crude represents the increase of the last six months over the first six months. Similarly in the last six months there were produced 281,347,717 gal. of gasoline more than in the first six months. Kerosene production was increased 69,192,521 gal. in the last six months. The relatively small increase made in the production of kerosene is due to large amounts being run into fuel oil which shows a substantial increase in production during the last six months.

Between Sept. 30 and Dec. 31 the stocks of gasoline on hand at the refineries increased 43 per cent, or 124,498,271 gal., this being the difference between 287,758,562 gal. on hand Sept. 30 and 412,256,833 gal. on hand Dec. 31. The average gain in gasoline on hand for the last four months of the year was 41,396,090 gal. per month.

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Vesta Accumulator Increases Prices

DETROIT, April 30—The Vesta Accumulator Co. will raise its prices on all batteries 5 per cent on May 10. The increase is due to the higher cost of labor and the difficulty of keeping a labor organization intact, due to the draft. The advance will be put in effect on all shipments made on or after May 10, regardless of the date on which the order was placed.

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Port Huron War Plant Destroyed

PORT HURON, MICH., April 29.—The entire plant of the American Machine Corp. has been destroyed by fire as the result of an explosion. The loss is estimated at $200,000. The plant was purchased from the American Machinery Co. several weeks ago by Detroit and Canadian interests. The concern has a Government contract for ammunition shells, and will probably rebuild the plant.

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Interstate to Market Trucks

MUNCIE, IND., April 26—The Interstate Motor Co. will place on the market trucks of 1 and 1½-ton capacity instead of passenger cars. The discontinuation of passenger car production is for the duration of the war only. The Interstate plant is now idle, but will soon be in operation again.

Stocks on Hand at the Refineries

	1917			
	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Crude oil (bbl.)	10,925,892	12,123,687	11,818,160	11,638,433
Oils purchased to be rerun (bbl.)	1,878,512	793,402	786,554	973,322
Gasoline (gal.)	287,758,562	320,203,770	360,241,135	412,256,833
Kerosene (gal.)	508,461,071	555,867,262	537,168,089	497,750,082
Gas and fuel (gal.)	633,216,982	690,209,380	630,190,045	577,899,112
Lubricating (gal.)	109,528,770	125,081,023	130,834,040	136,855,342
Wax (lb.)	.....	112,802,614	122,766,409	135,059,927
Coke (tons)	.....	8,823	9,667	7,585
Asphaltum (tons)	.....	61,994	53,650	52,860
Miscellaneous (gal.)	.....	258,439,112	248,731,757	261,363,964

Production of Crude and Distillates

	First Six Months	Last Six Months	Total, 1916	Total, 1917
Crude oil run (bbl.)	144,095,162	157,224,156	246,992,015	301,319,318
Gasoline (gal.)	1,224,182,158	1,505,529,875	2,058,880,596	2,729,712,033
Kerosene (gal.)	748,411,291	817,603,812	1,455,495,732	1,566,015,103
Gas and fuel (gal.)	2,724,646,700	3,563,783,881	4,663,895,284	6,288,430,581
Lubricating (gal.)	350,358,041	371,286,780	624,541,195	721,644,821
Wax (lb.)	203,975,713	237,132,251	386,180,898	441,107,964
Coke (ton)	229,723	254,457	405,319	484,180
Asphaltum (ton)	321,805	368,474	716,490	390,279
Miscellaneous (gal.)	139,467,183	523,682,687	239,244,468	663,149,870
Losses (bbl.)	5,211,839	7,062,011	10,008,517	12,273,850

Output of Refineries in the United States by Months During 1917

	Crude Run (bbl.)	Oils Purchased and Rerun (bbl.)	Gasoline (gal.)	Kerosene (gal.)	Gas and Fuel (gal.)	Lubricating (gal.)	Wax (lb.)	Coke (ton)	Asph. (ton)	Misc. (gal.)	Loss (bbl.)
January	23,157,349	.....	189,169,526	120,735,586	443,955,903	57,954,874	34,084,178	37,622	48,860	21,089,919	844,007
February	21,570,486	.....	172,704,579	113,369,304	424,115,567	51,831,577	31,439,730	35,672	39,795	20,013,294	864,931
March	24,460,800	.....	203,677,089	141,123,626	467,378,504	60,848,934	35,105,016	41,968	51,265	21,217,958	794,009
April	24,410,623	.....	213,131,665	140,594,030	439,724,364	59,546,525	35,267,563	40,084	50,404	24,647,645	887,243
May	25,707,420	.....	225,655,440	132,850,318	481,281,431	62,247,738	34,318,668	37,919	63,692	25,874,828	886,767
June	24,788,484	.....	219,843,859	135,738,427	468,190,931	57,928,393	33,760,558	36,458	66,789	26,623,539	934,882
July	26,064,350	2,435,533	238,309,073	157,259,832	585,932,568	62,307,742	36,548,059	39,814	65,272	90,637,733	1,060,020
August	27,269,383	2,376,580	249,365,562	145,678,500	620,029,660	62,347,947	38,832,839	43,787	73,878	91,115,337	1,241,281
September	26,867,024	2,632,988	250,348,628	138,769,343	618,067,279	58,686,398	37,440,127	40,101	62,520	79,127,814	1,130,900
October	26,971,980	2,863,518	265,634,890	135,775,025	608,327,006	66,289,783	46,623,624	45,746	61,579	90,341,931	1,299,477
November	25,516,693	2,519,700	258,696,514	121,133,610	580,140,259	62,631,249	39,502,105	42,708	58,849	85,863,880	1,147,662
December	24,534,726	2,069,351	243,175,209	118,987,502	551,287,109	59,023,661	38,185,497	42,301	47,376	86,595,992	1,182,671
Total	301,319,318	14,897,670	2,729,712,033	1,602,015,103	6,288,430,581	721,644,821	441,107,964	484,180	690,279	663,149,870	12,273,850
Daily Average	828,532	*40,816	7,478,663	4,389,082	17,228,577	1,977,109	1,208,515	1,327	1,891	1,816,849	33,627

*No account of this item for first six months.

English Like Fordson Tractors

Importation of Miscellaneous Types May Be Restricted by Parliament

LONDON, ENGLAND, April 15—The Fordson tractors purchased by the Government are getting into general use throughout England, and are giving fine results. While dealers in other makes of tractors naturally feel that the situation is against them, still the broad-minded ones acknowledge that under present conditions the British Government has taken a necessary step, and that the Government should increase the number of Fordson or any other standardized type of tractor that is being used rather than permit the importation of miscellaneous types of machines.

It is questionable if the importation of miscellaneous lines of tractors will be permitted during the present year, as all ocean space available is now required for government imports.

The question of dust in tractor engines which has given so much trouble in parts of America, and has proven so ruinous to engines, will not be so difficult a problem to overcome in England. Here the summers are not sufficiently hot and dry, and it is rare that you see the dust so bad that you cannot walk behind the plow with comfort.

It is possible that the burning of kerosene will not be extremely difficult, as the greater moisture content in the air may be of assistance. Here the fields are smaller and the continuous strain on the engine not so great.

One of the greatest difficulties with tractors in England is the very great varieties of soil. Frequently in the same field soil conditions change entirely, as you will have sand, loam, gravel and chalk as close to each other as the fences along the roadside. This imposes heavy work on tractors and calls for engine power equal to the heaviest job.

The sale of farm tractors throughout Great Britain seems now certain of being handled practically exclusively by automobile dealers. Exclusive dealers in agricultural machinery are very few in England, Scotland, Wales and Ireland, and the original agricultural people having largely merged into the motor business in the past years, the sentiment is strong throughout the British Isles that, as the motor car dealers are taking care of the truck business and the repair shop business, it would be a lack of economy to equip similar lines of repair shops for farm tractor work.

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Government to Control Minor Metals

WASHINGTON, D. C., May 1—The Administration bill to control and conserve minor metals has been passed by the House, and though power to fix prices has been eliminated from it the control of prices is assured under a licensing plan. Producers of such metals as antimony, manganese, tungsten and others necessary for the manufacture of munitions are to be licensed and controlled by the Department of the Interior. Following are the metals and minerals defined as essential to war production and subject to control under the bill:

Antimony, arsenic, ball clay, bismuth, bromine, cerium, chalk, chromium, cobalt, corundum, emery, fluorspar, fullers earth, graphite, grinding pebbles, iridium, kaoline, magnesite, manganese, mercury, mica, molybdenum, osmium, sea salt, platinum, palladium, paper clay, potassium, pyrites, radium, sulphur, thorium, tin, titanium, tungsten, uranium, vanadium, zirconium and their metallurgical products and chemical compounds.

Under the regulations and purposes of this act the United States can prevent any pro-German interests from controlling the metals and minerals so as to interfere with the military establishment. The Government can also, in event of shortage of the minerals or metals, take over mines and fields for increased production, or cultivate new fields or mines. In the event of a serious shortage, the Government can also dictate to industries the quantity of these metals and minerals they may use in the manufacture of their products. At this time, so far as can be ascertained, neither the Bureau of Mines nor the Secretary of the Interior has any intention of using the curtailment power. The Bureau of Mines, which is a section of the Department of the Interior, will be the department directly connected with the enforcement of the bill.

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Class Journal Buys Horseless Age

NEW YORK, April 30—The Class Journal Co., publisher of AUTOMOTIVE INDUSTRIES, has purchased *Horseless Age* of New York City, the oldest motor car publication in America. The publication of *Horseless Age* will be continued under the new management. The Class Journal Co. also publishes *Motor World, Commercial Vehicle, Motor Age* and *Transfer & Storage.*

—

Maxwell Takes Over Chicago Distributer

CHICAGO, May 2—The Maxwell factory has bought out Harry Newman, distributer in this territory for Maxwell and Chalmers cars, who conducted his business under the style Harry Newman Stratton Co. This action, it is understood, is in accordance with the policy of of the Maxwell company to take over some of the larger distributers and operate them as branches. A. J. Banta, formerly assistant sales director of the Chalmers company, and previous to that vice-president of the Premier Motor Corp., and for many years manager of the Chicago branch of the Locomobile Co. of America, has been made manager of the Chicago Maxwell branch. Harry Newman has not yet announced his future plans.

To Investigate Labor Conditions

Government Representatives to Study Detroit's Problems and Make Report

DETROIT, May 1—Indications that the government has awakened to the realization of the shortage of labor in Detroit is shown by the arrival of several government representatives who have come to investigate the city's labor problems. These men are going over the situation now and a report is expected within 10 days. Manufacturers are urged to claim exemption for all employees necessary to production. After a thorough analysis of the labor situation the data collected will be submitted to the government for action.

An effort will be made to introduce women wherever possible, if men are not available.

Regarding the exemption claims of men, the District Board of the eastern division of Michigan has sent out a notice to manufacturers, part of which reads:

> 1. We wish to call your attention to the absolute necessity of notifying this board promptly whenever a registrant for whom you have claimed deferred classification leaves your employ. . . . It will be necessary for us to limit deferred classifications only to those firms who cooperate with us fully. 4. The District Board is always glad to cooperate with manufacturers and other industries, in giving information, or in discussing matters pertaining to industrial claims. . . .

It is stated in a dispatch from Washington that funds had been appropriated for bringing 80 skilled mechanics to Detroit from surrounding cities. The men will work in the Ford Motor Co. factory in the manufacture of submarine destroyers.

The closing of many freight warehouses for 2 or 3 days of the week is an indication of the shortage of labor. Although the Michigan Central freight house requires at least 25 gangs of men to handle freight, it is able to secure only 4 gangs. It is believed that the reason for this is the fact that the men can obtain better wages in other work, but the wage compression for railway employees which will be released May 5 will remedy this condition to some extent.

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Ohio To Improve Buffalo Road

DETROIT, May 1—Two of the most important roads in northern Ohio will be improved this year. They are the Ashtabula-Conneaut link of the Buffalo route and the Northfield road from Cleveland to Akron. Work will in all probability be started this season. When the Conneaut link is completed, a hard-surfaced road will extend all the way from Toledo via Cleveland to Buffalo. Traffic between Akron and Cleveland is greater than between any other two cities in the state, and Akron industries are said to be almost entirely dependent on highway transport to Cleveland.

557 Fordson Tractors For Michigan Farmers

LANSING, MICH., April 30—At the close of the Michigan War Preparedness Board's campaign for the sale of Fordson tractors to the farmers of the State, a total of 557 orders had been received. Therefore, only a trifle more than half of the 1000 tractors apportioned to Michigan will be taken, as the State assumed no obligations to deliver more than those actually ordered and paid for at the close of the drive.

Tractors were purchased by 62 counties. Wayne County took 51, Washtenaw 31, Ingham and Oakland each 23. Tractor sales from now on will be handled by agents, 7 of whom have already been appointed. Orders are coming to the factory from them, in spite of the fact that no price has been set yet. However, it is believed that the retail price of the tractors will be $800.

About 12 carloads of tractors remain to be shipped from the factory to farmers who bought them during the Michigan drive. These will all have been delivered to the buyers within a few days.

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Rural Express Service to Start May 4

WASHINGTON, April 28 — Three routes for rural motor express service between Virginia and Washington, which will begin May 4, have been worked out by the local Food Administrator and the president of the Washington Chamber of Commerce. It is planned to have the motor trucks leave the Virginia terminals early each morning, reach Washington at noon and return the same day over the same route, covering a total distance of 80 miles per day. Under this plan it will be possible not only to carry produce to the city but also to deliver city merchandise to the farmer.

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Republic Los Angeles Plant in Operation

LOS ANGELES, April 30.—The Los Angeles assembling plant bought by the Republic Motor Truck Co., Alma, Mich., in February, is now in full operation, and within the next few months expects to be assembling a minimum of 60 trucks a week. The building has a working floor space of about 6 acres, and in addition a dry-kiln and paint shop, a power plant and an office building. J. D. Poyer, formerly Republic Truck distributor in Los Angeles, has been appointed general manager of the plant.

The Los Angeles branch, according to an official statement, will give the company opportunities for foreign trade with the Far East, besides supplying Republic dealers and users in this territory.

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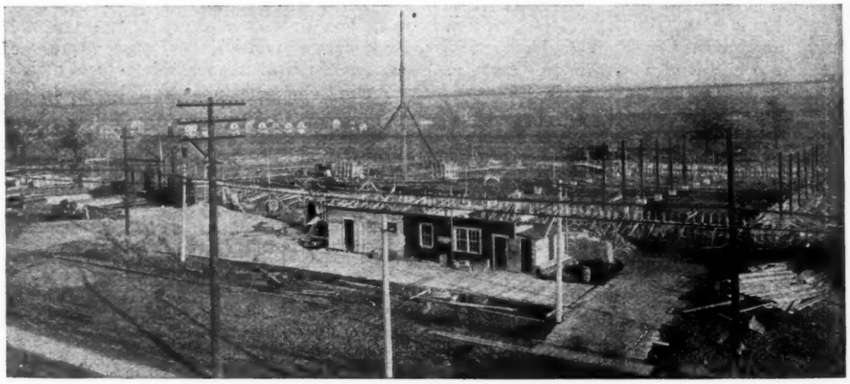
Standard Parts Declares Dividend

CLEVELAND, May 1—The Standard Parts Co. has declared a regular quarterly dividend of 1½ per cent on the common stock, payable May 15 to stock of record April 30.



Appearance of the Glen L. Martin plant in Cleveland March 30, and its condition 29 days before the lower photograph was taken. In less than one month the plant was completely enclosed

Return Load Bureau for Detroit and Nearby Cities

DETROIT, April 30.—Plans are being completed to establish a Return Load Bureau here. Letters have been sent out to all truckmen in this and adjoining cities, as well as the Chambers of Commerce, to get detailed information of the amount of tonnage available in each direction. Arthur T. Waterfall, traffic manager of Dodge Brothers, has been appointed chairman of the transport committee which will have charge of the new bureau.

Several concerns are engaged in this work at present. The General Storage & Cartage Co. operates three trucks between Detroit and Pontiac, all leaving Detroit at 6.30 a.m. daily. Two of these trucks load at one point and the third picks up shipments at other places in the city. The company has arranged with Pontiac concerns for capacity tonnage on the return trip. The trip requires 3 hr.

The Michigan Warehouse Co. operates a fleet of 15 trucks between Detroit and outlying towns. This company, however, maintains no schedule, but is making efforts to have trucks loaded on the return journey. The trucks are operated only when necessary and most of the business is done between here and Pontiac. Sometimes a truck leaves every day, and at times only two or three times a week. The regular rates of this company are 35 cents per 100 lb., but a minimum charge of $1 is asked.

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Chicago to See Truck Train

CHICAGO, May 1—The first motor truck train to enter Chicago will arrive this morning. These are 5 commercial vehicles, units in the Boston-Akron express service that the Goodyear Tire & Rubber Co. inaugurated a year and a half ago. The trucks which are loaded with tires, tubes and other accessories will be met at the outskirts of the city by members of the Chicago Automobile Trade Assn., the Traffic Club of Chicago and the Chicago Assn. of Commerce. Tomorrow the trucks will leave for Baltimore with Red Cross supplies for Pershing's army.

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To Run Freight Boats from Detroit to Buffalo

DETROIT, April 30.—Operations of two large steamers between Detroit and Buffalo by the Detroit & Cleveland Navigation Co., after May 6, will simplify drive-aways to the eastern part of the country. The City of Cleveland III and the City of Detroit III will make regular trips, and will probably be taken up almost entirely by automobiles and trucks.

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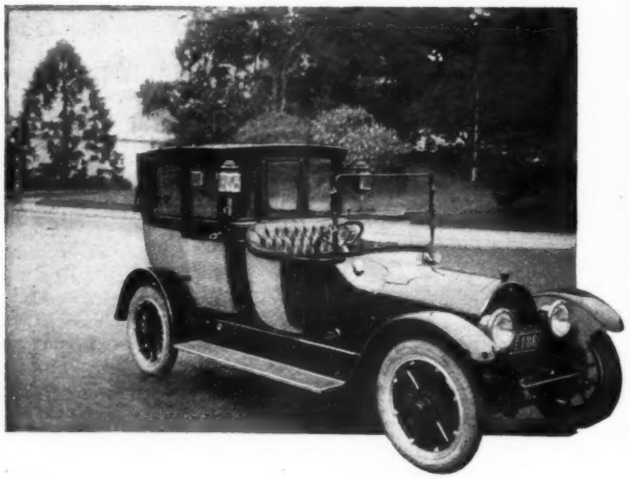
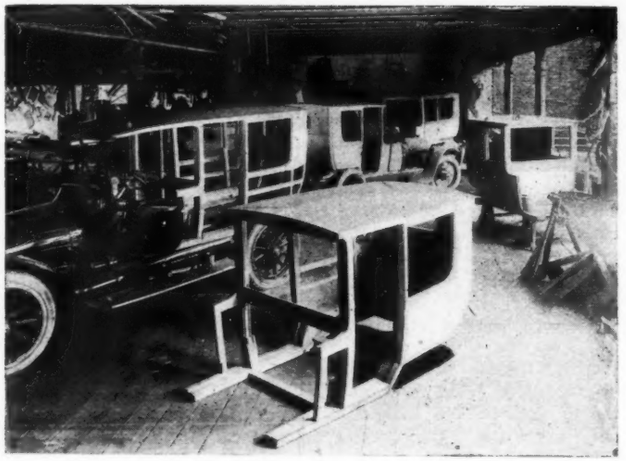
Parrish-Bingham Building Addition

CLEVELAND, April 29.—The Parrish-Bingham Co., manufacturer of pressed steel frames, is erecting a building 120 x 144 for hardening and pickling steel.

South American Company Building Its Own Bodies

Distributer Studied Design and Methods in the United States





Due to a lack of shipping facilities and a 20 per cent increase in custom duties, Fehling Brothers, Cadillac agents in Buenos Aires, Argentina, as well as several other large importers, are building their own bodies. The photographs show a town car completed by them and the interior of the Fehling body construction department

Gillette Rubber's Earnings Large

EAU CLAIRE, WIS., April 29—The accumulation of a surplus account of $119,601 in the first 7 months of operation was reported at the first annual meeting of stockholders of the Gillette Rubber Co., last week. The company made its first tire on May 23, 1917, and has since produced more than 100,000.

The daily output will be increased from 500 tires and tubes to 750 casings and 1000 tubes on May 1. The total investment of the company is $1,434,520, and plant and equipment recently were appraised at $507,607. Current assets on April 1 were $988,750, including $77,427.60, cash in banks; $478,664.62, raw materials, inventoried at cost, and $353,619 accounts receivable.

The monthly payroll averages $20,000. Since organization, the company has paid out $1,235,922 for raw materials and $180,485 in wages. The total working force numbers 300.

The company is more than 10,000 tires behind on immediate delivery, with unfilled orders amounting to $663,231.

Officers and directors were re-elected as follows: President and treasurer, S. P. Woodward, New York; vice-president and general manager, R. B. Gillette; vice-president and chief engineer, Edward Hutchens; vice-president, C. G. Race; directors, S. P. Woodward, R. B. Gillette, C. G. Ruth, N. J. Whelan, A. E. Burr and F. C. Herman. S. H. Smith is general superintendent and H. L. Cook is general sales manager.

N. A. D. to Perfect Theft Law

ST. LOUIS, April 30—The National Automobile Dealers' Assn. has offered to help the American Society of Secretaries of State perfect a proposed law to prevent motor car thefts. It is planned to introduce this in every state legislature at its next session. The proposed law makes transfer of cars like that of land. All transfers will be completed by recording, with the proper authority, the transfer identifying marks and engine number of the car.

All of the cars not transferred in accordance with the law are to be considered stolen property. Cars without engine numbers must have them supplied by the State License Bureau so that they can be cut into the metal.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	55	60	..
*J. I. Case T. M. Co. pfd.	82	86	—2½
Chalmers Motor Co. com.	6	8	..
Chalmers Motor Co. pfd.	30	40	..
*Chandler Motor Co.	78	82	—1
Chevrolet Motor Co.	118	122	—2
*Fisher Body Corp. com.	31	35	+1
*Fisher Body Corp. pfd.	80	87	..
Fisk Rubber Co. com.	49	52	—1
Fisk Rubber Co. 1st pfd.	98	103	..
Fisk Rubber Co. 2nd pfd.	70	75	..
Firestone Tire & Rubber Co. com.	96	99	+3
Firestone Tire & Rubber Co. pfd.	95	96	—1
*General Motors Co. com.	116	118	—4
*General Motors Co. pfd.	78½	79½	— ½
*B. F. Goodrich Co. com.	44½	46	—1
*B. F. Goodrich Co. pfd.	96	100	+ ½
Goodyear Tire & Rubber Co. com.	148	152	+11
Goodyear Tire & Rubber Co. pfd.	96	98	+ ½
Grant Motor Car Corp.	3	4½	+ ½
Hupp Motor Car Corp. com.	2¾	3½	..
Hupp Motor Car Corp. pfd.	78	85	..
International Motor Co. com.	22	25	+2
International Motor Co. 1st pfd.	52	56	..
International Motor Co. 2nd pfd.	24	28	..
*Kelly-Springfield Tire Co. com.	41	43	..
*Kelly-Springfield Tire Co. 1st pfd.	75	85	..
*Lee Rubber & Tire Corp.	13½	14	+1
*Maxwell Motor Co., Inc. com.	25½	26	—4
*Maxwell Motor Co., Inc., 1st pfd.	51	54	—3
*Maxwell Motor Co., Inc., 2nd pfd.	18	23	+1
Miller Rubber Co. com.	105	108	+2
Miller Rubber Co. pfd.	95	97	..
Packard Motor Car Co. com.	92	96	+1
Packard Motor Car Co. pfd.	89	92	..
Paige-Detroit Motor Car Co.	16½	18½	+ ½
Peerless Truck & Motor Corp.	13	15	—1
Portage Rubber Co. com.	..	104	—3
Reo Motor Car Co.	14	16	+ ¾
*Saxon Motor Car Corp.	6½	8	+1
Standard Motor Construction Co.	12	14	..
*Stewart-Warner Speed Corp.	54	56	+ ½
*Studebaker Corp. com.	36	37	—3
*Studebaker Corp. pfd.	80	90	..
Swinehart Tire & Rubber Co.	26	30	—5
United Motors Corp.	24⅞	25⅛	—1⅛
*U. S. Rubber Co. com.	57⅛	58	+3½
*U. S. Rubber Co. pfd.	102	103	—1
*White Motor Co.	42	42½	— ½
*Willys-Overland Co. com.	17	17½	— ½
*Willys-Overland Co. pfd.	81	83	—2

*At close. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Change
Auto Body Co.	..	8	..
Bower Roller Bearing Co.	17¼	18¼	..
Chevrolet Motor Co.	120	122	..
Commerce Motor Car Co.	..	9¾	..
Continental Motor Co. com.	5⅜	5⅝	— ⅛
Continental Motor Co. pfd.	..	..	..
Edmunds & Jones, com.	..	..	..
Edmunds & Jones, pfd.	..	..	..
Ford Motor Co. of Canada	198	206	—5
Hall Lamp Co.	..	..	..
Michigan Stamping Co. com.	13¼	14¼	..
Motor Products	..	..	..
Packard Motor Car Co. com.	95½	..	+3½
Packard Motor Car Co. pfd.	..	91½	..
Paige-Detroit Motor Car Co.	17⅛	..	+ ⅜
Prudden Wheel Co.	11¾	12½	..
Reo Motor Car Co.	14¾	15⅛	— ⅜

INACTIVE STOCKS

Atlas Drop Forge	..	26	..
Kelsey Wheel Co.	90	92	..

Willys-Overland Ready To Increase Its War Work

TOLEDO, OHIO, April 29 — The Willys-Overland Co. is ready to manufacture war products on an enlarged scale, and will increase its working force from 12,000 to 15,000 men at once. For some time, the company has been installing special machinery and reorganizing parts of its plant for government work, contracts for which aggregate more than $27,000,000 according to reports. Airplane engines and gun carriage parts are being made at the Toledo plant, and it has been announced that a new building will be erected soon for the manufacture of shells.

During March, the company produced and shipped 832 Curtiss training plane engines. Unfilled orders aggregate 18,000 cars. The present output is 500 cars a day, and it is expected that this will be increased greatly. Production for 1918 is scheduled at 115,000 cars as compared with 140,000 last year.

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Universal Machinery to Have New Plant

MILWAUKEE, April 29—The Universal Machinery Co., manufacturer of lathes, boring mills, drill presses, etc., is planning to build a complete new plant at the north limits of West Allis, the manufacturing suburb of Milwaukee. The first units to be built will be a machine shop, foundry, power house, and auxiliary structures. J. E. Purdy is secretary and treasurer of the company.

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Stewart-Warner Buys Bonds

CHICAGO, April 29.—The Stewart-Warner Speedometer Corp. has subscribed for $201,400 worth of Liberty Bonds. Within 4 days after the campaign was announced, 1637 employees of the company had signed subscriptions. This amount was for the Chicago factory only, and does not include subscriptions from the Beloit plant, nor any of the 60 Stewart-Warner branches and service stations.

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Wagner Electric Men Strike Again

ST. LOUIS, April 30—The strike at the three plants and service stations of the Wagner Electric Co. was renewed Friday, and strike leaders report that 2200 of the 3400 employees are out. The number of striking employees given by officials of the company is lower. The strike is a renewal of the one settled a month ago at the request of the War Department, as the company is making shells as well as starters. The workmen complain that their employers have not fulfilled the promises they made to the War Department.

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Buying Locomobile Gold Bonds

NEW YORK, April 29—The first mortgage ten-year sinking fund 6 per cent gold bonds of the Locomobile Co. of America, which bear coupons maturing after June 1, 1918, will be taken by the Bankers Trust Co., as trustee for the Locomobile Co., at prices not exceeding 105 per cent of the face value of the bonds. The banking organization has invited proposals for the sale of these bonds to be received not later than noon, May 9. Notice will be given later to those bondholders whose proposals have been accepted.

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Current News of Factories

Notes of New Plants—Old Ones Enlarged

Holt Gets Government Contract

CLEVELAND, April 29—The Holt Mfg. Co. has received a Government contract for 45 high-power crawler tractors.

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Chalkis Gets Gun Contract

DETROIT, April 29—The Chalkis Mfg. Co., of which Hugh Chalmers is president, and D. H. Peoples, secretary-treasurer, has received an $8,000,000 contract for anti-aircraft 3-in. guns.

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Dividends Declared

The Westinghouse Electric & Mfg. Co. has declared a dividend of 1¾ per cent (87½ cents per share) on the common stock for the quarter ending March 31. This will be paid on April 30 to holders of record April 4.

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The Stewart-Warner Speedometer Corp. has declared a quarterly dividend of 1½ per cent payable May 15 to stock of record April 30.

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The Bessemer Motor Truck Co., Grove City, Pa., has declared the regular quarterly dividend of 2 per cent on its preferred stock, payable May 1 to stock of record April 20.

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The Grant Motor Car Co. has declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable May 1 to stock of record April 20.

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Capital Increases

DETROIT, April 29—The Defender Auto Lock Co. has increased its capital stock from $2,500 to $25,000.

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MARIETTA, OHIO, April 29—The Northwestern Chemical Co. has increased its capital stock from $150,000 to $500,000.

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GARY, IND., April 29.—The Gary Motor Truck Co. has increased its capital stock from $125,000 to $175,000.

Wisconsin Duplex Company Equipping Oshkosh Plant

OSHKOSH, WIS., April 29—The Wisconsin Duplex Auto Co., originally organized at Clintonville, Wis., and now located here, is retooling and equipping the former plant of the J. L. Clark Carriage Co. It expects to be ready to start regular production of chassis by July 1. The design has been perfected and work on the preparation of jigs, dies and special machinery is now under way. William A. Besserdich, a member of the original firm of Zachow & Besserdich, from which the Four Wheel Drive Auto Co. grew, is president and general manager of the Wisconsin Duplex company.

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Monarch Tractor to Add

WATERTOWN, April 29—The Monarch Tractor Co. has broken ground for a 1-story brick and steel shop addition, and is planning to enlarge its foundry. The Monarch Tractor Co., Ltd., of Toronto, a subsidiary concern, has erected a factory group and will start a regular production of tractors about May 1.

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Air-O-Flex Stock Price Increased

DETROIT, April 28—The Air-O-Flex Automobile Corp. has increased the price of its stock to $7.50 a share. The company has been selling founder stock by permission of the Michigan Securities Commission at $5 a share (par $10). The commission allowed the corporation to dispose of $2,300,000 of its $2,500,000 capital stock in Michigan.

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Haynes Insures Employees

KOKOMO, IND., April 29 — The Haynes Automobile Co. has given life insurance policies to all its employees for varying amounts depending on length of service. The amount of the policy increases with the period of service until it reaches a maximum at the end of the tenth year.

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Another Boone Tire Plant in Operation

CHIPPEWA FALLS, WIS., April 29 —The Boone Tire & Rubber Co. of Sycamore, Ill., expects to have its plant here in operation on a regular production schedule on May 1. The daily output at the start will be 750 tires and tubes in addition to rubber footwear.

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Vim Motor Controls Sandusky Forge

SANDUSKY, OHIO, April 27 — The Vim Motor Co. has obtained control of the Sandusky Forge Co. The former concern, which recently increased its capital stock from $60,000 to $400,000, has received a Government order for steel hubs for artillery wheels.

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Nelson to Ship New Models

DETROIT, April 29—The A. E. Nelson Co. expects to start its first shipment of new cars in a few days. The chassis are all ready, and immediately upon the arrival of the bodies which have been ordered and are expected any day, the cars will be ready to go out.

Men of the Industry

Changes in Personnel and Position

J. V. Thomas Appointed Stearns Sales Manager

J. V. Thomas has been promoted to the position of sales manager of the B. F. Stearns Co., Cleveland. For the past year, he has been assistant sales manager.

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W. A. Clare, for 2 years general sales manager of the Atterbury Motor Car Co., Buffalo, N. Y., has been appointed assistant secretary of the company. In addition to his new duties, he will continue in the position of general sales manager.

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Fred D. Williams has resigned as head of the power specialties department of the H. W. Johns-Manville Co. and has been appointed assistant general manager of the L. H. Gilmer Co., Tacony, Philadelphia.

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R. S. Elliott, for the past 2 years sales manager of the L. H. Rose-Chalmers Co., Chalmers distributer for northern California, has resigned. Previous to his connection with the Chalmers company, he was sales manager for Don Lee, Pacific Coast Cadillac distributer.

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R. B. Campbell, branch manager of the Bearings Service Co., Detroit, has been transferred from Atlanta, Ga., to the Detroit branch.

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C. M. Garrett, purchasing agent of the Midland Motor Car & Truck Co., Oklahoma City, has opened an office in Detroit.

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M. J. Wise, formerly district sales manager of the Federal Motor Truck Co. in the middle west, has been appointed district sales manager for the Acason Motor Truck Co., Detroit. He will cover the same territory.

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F. E. Hurst, for the last year and a half assistant factory manager of the Chevrolet Motor Co., has resigned, and has become associated with the Doble-Detroit Steam Motors Co., Detroit. He will work with H. L. Innes, vice-president and general manager of the company.

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A. W. Schlabach, formerly in the publicity department of the Saxon Motor Car Co., has been appointed assistant advertising manager of the Paige-Detroit Motor Car Co., Detroit.

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R. A. McNamee has been appointed traffic manager of the Liberty Motor Car Co., Detroit.

J. P. Nicholson has been appointed manager of sales in the Chicago district for the truck department of James Levy, who handles the Fulton truck for a large territory. Mr. Nicholson was formerly manager of the Chicago branch of the Service Motor Truck Co.

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L. Charipar of the purchasing department of the King Motor Car Co., Detroit, has resigned to become associated with the C. R. Wilson Body Co. plant at Bay City, Mich.

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Eulogy to Colonel Bolling

WASHINGTON, April 27—Following the death of Col. R. C. Bolling on a battlefield in France, the Aircraft Production Board has issued the following resolution:

"Colonel Raynal C. Bolling, Signal Corps, United States Army, was killed by the enemy on a battlefield in France in the performance of his duty. Colonel Bolling was a member of the Aircraft Production Board, and rendered distinguished service to his country as a member of a mission to Europe to negotiate important military matters between the United States and Allied Governments. His high motives, brilliant attainments and unfailing devotion rendered his work of inestimable value to his country and deepen the sense of personal loss to the members of this board.

"Be it resolved, therefore, That this statement be spread upon the minutes of the board, and a copy of the same be sent to his family as a brief memorial to the brave gentleman and gallant soldier, Raynal C. Bolling, Colonel, Signal Corps, United States Army, killed in action in the defense of his country in the cause of liberty among the nations of the world."

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Charles A. Francis Dies

DETROIT, April 30—Charles A. Francis, superintendent of the body department of the Packard Motor Car Co., Detroit, is dead. Mr. Francis was for 25 years superintendent of the Studebaker factory in South Bend, and was with the Packard company for 8 years.

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Harry F. Biggam, Jr., Dies

CORUNNA, MICH., April 30—Harry F. Biggam, Jr., secretary of the Biggam Trailer Corp., died yesterday.

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Friedlander Forms United Motor Parts

CHICAGO, May 1—William Friedlander has organized the United Motor Parts Corp. here, which will handle special lines of accessories, including bumpers, tires, lenses and gauges for domestic and foreign trade. General offices have been opened at 1132 Wabash Avenue.

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Remaining Hal Property Auctioned

CLEVELAND, April 27—The remaining property of the Hal Motor Car Co. was auctioned here yesterday. One item was 10 finished cars, and there were also accessories, machinery and furniture. The inventory value of the property was placed at approximately $200,000.

New Companies Formed

Latest Additions to Ranks of Automotive Industries

C. J. Welch Organizes Western Trailer Company

KANSAS CITY, April 30—C. J. Welch has organized the Western Trailer Co. and has bought the plant of H. K. Bascom, body builder, and an adjoining garage. He has already started production of motor truck and commercial bodies.

The company is installing new equipment and rebuilding the plant. Mr. Welch has been elected president and general manager of the company. H. P. Wells, formerly chief engineer of the Columbian Steel Tank Co., Kansas City, has been appointed efficiency engineer on construction, and A. S. Page, for 14 years chief engineer of the American Car & Foundry Co., has been appointed consulting engineer on trailers and bodies.

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New Rubber Plant in Milwaukee

MILWAUKEE, April 29—A rubber manufacturing plant will be established in Milwaukee by the Great Lakes Rubber Co., organized with a capital stock of $100,000 by Donald C. Barbee, general manager of the Badger Belt & Rubber Co. Five acres of land have been purchased in Cudahy, a suburb, and the first unit of the new plant will afford about 45,000 sq. ft. of floorspace.

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Tractor Motor in Production

BOYNE CITY, MICH, April 27—The final organization of the Tractor Motor Co., which will manufacture engines under Field Motor Co. patents, has been completed and production will start immediately. Frank Kaden, John Bergy, W. L. Martin, William Rapelin and W. S. Shaw are members of the board of directors.

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Monroe Motor Plant Bought

PORT HURON, MICH., April 30—The Chief Motor Co., a Canadian corporation, capitalized at $1,000,000, has purchased the Port Huron plant of the Monroe Motor Co., and will manufacture engines for farm tractors. J. E. Erd and H. S. Erd of Saginaw, formerly of the Erd Motor Co., are the principal officials. The Chief company will employ 300 men.

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Regal Business to Be Sold

DETROIT, April 30—As a result of a meeting of the larger creditors of the Regal Motor Car Co., it was recommended that the receiver sell the business at public auction the latter part of June. The service business will be continued in the meantime.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Steel Makers All Pledge Government Work Exclusively

The pledge of all the leading steel manufacturers of the country given at New York last week to the Director of Steel Purchases, to operate on Government orders to the exclusion of commercial business, is the most momentous development of the war as affecting the industry.

As with price fixing the action is in the form of an agreement, but back of it is a degree of pressure that has not appeared previously in any of the Government's dealing with the steel trade. The War Industries Board, having tolerated for some time opposing opinions on the question whether there has been a scarcity of plates and some other forms of steel needed by the Government, has now asked for an actual demonstration by the concentration of blast furnaces, steel works and rolling mills upon war work. To every member of the American Iron and Steel Institute a pledge form has been sent which is a promise to subordinate all commercial demands to Government requirements, and a practically unanimous response is expected.

Includes Railroad Equipment

The estimate of the War Industries Board that recent mill deliveries on Government orders have been at the rate of 33,000,000 tons a year, or close to 90 per cent of production, includes as war work all railroad requirements and those for agricultural implement plants, mines, oil wells and every other essential operation. This broad construction makes the new policy less drastic than some sensational statements have indicated.

No closing down of metal-working plants has resulted as yet, but it is inevitable that stoppages in non-essential lines will come soon. Jobbers had fair shipments from some finishing mills in April and their stocks will help to postpone shutdowns.

Plate Mills to Be Well Supplied

Not only will plate output, which is the special object of Government concern, be kept to the high rate of April, but pig iron and steel from plants in other lines will be shipped to plate mill operations to swell their output. Thus steel makers whose product may not at a given time be 100 per cent for the Government will not be allowed to turn to commercial business.

Official stress is put upon the amount of steel this country must deliver to its Allies, including 300,000 tons of plates to Great Britain, 200,000 tons to Japan, 60,000 tons to Italy and considerable to Canada. In addition is a half million tons in other forms owed to Great Britain and France.

There is the opinion among producers that a 60-day concentration on Government orders will make it possible to resume general business to an extent.—*Iron Age.*

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Accessories Boost Airplane Cost

(*Continued from page* 879)

manufacturers. At the same time it enables the Signal Corps to keep the supply of instruments adequate for the demands of the airplane builders, relieving them from this work, and it also affords standard equipment and interchangeability.

When the American air program began to develop none of the instruments now so vital to the service was being produced in quantities, and some of them were not being produced at all. Over 60 per cent of these instruments had to be developed from foreign models, and the remaining 40 per cent was secured by modifying or remodeling American automobile-type instruments. Numerous and serious difficulties were encountered in designing instruments, capable of quantity production, of the lightest possible weight and under exacting requirements as to accuracy. During this pioneer work, new instruments were being developed abroad almost daily, each new design carrying an improvement.

Most of the work in this connection was done by the Signal Corps in conjunction with manufacturers. All available information and data were collected, foreign and domestic models and types were carefully tested, designs were standardized and specifications prepared. Results show that types for every class of instruments have been adopted and put into production here. Far greater standardization has been reached than exists in Europe today, tending to increase quantity production materially and decrease the number of replacement parts necessary.

Quantity production on the scale necessary demanded the enlargement of all existing sources of supply and the creation of many new plants and factories. A certain amount of time was available before it was necessary to use these instruments on planes in service—the planes themselves had to be built. Accordingly, orders were placed from three to eight months ahead of requirements, but only in such quantities as would insure a steady production, owing to the certainty of improvements in the various designs. The early plans of the production department have developed from two to five sources for each instrument, established both as a safety measure and as a means of placing future orders on a strictly competitive basis.

Various Instruments Developed by the Signal Corps

The Tachometer indicates the number of revolutions per minute at which the engine is running.

Another instrument gives the speed in relation to the air. When instrument matters were taken up last July there were no tachometers manufactured in this country of the type which has proven most successful abroad, namely, the escapement or chromatic type. Two large manufacturing companies are now turning out these instruments in large quantities, one of them 100 a day, and a third company has also in production a new centrifugal type.

The air speed indicator is a pressure gauge for showing the speed of the plane in relation to the air, not the earth. This instrument includes what is known as a Venturi-Pitot tube, which is fastened to a strutt and takes in the air from ahead. The air sets up a corresponding pressure in an auxiliary tube, which is calibrated and indicated on a dash-board recording press gauge.

The altimeter is an aneroid barometer, graduated to read height above the earth instead of pressure. Under standard specifications a reduction in weight and size was effected in the manufacture of these instruments, which are now being produced in large quantities and of a quality equal to the best foreign make. Three standard types are made with ranges of twenty, twenty-five and thirty thousand feet. Production was up to 500 a week in April.

The airplane compass has not yet reached the perfection desired. A new type having advantages over any present form of compass, especially as to compactness, is now used. In the development of this instrument effort has been made to reduce the weight to the safest possible minimum and to decrease the space required in the airplane. One concern is now turning out compasses at the rate of 200 a week.

With airplane clocks, due to the development which had been made in clocks for automobiles, it was only necessary to standardize a design of mounting in order to adapt such clocks to airplanes. Sufficient quantities are now obtainable for all needs.

Pressure gauges. Instrument-board pressure gauges were already manufactured here in large quantities, and as soon as standard specifications were developed production started. Two types are used; one to register the air pressure which forces the gasoline to the engine, and the other to show the pressure produced in the oiling system by the oil circulating pump. Standard forms of cases and dials with interchangeable glasses and bevels have been designed.

The radiator thermometer is mounted on the instrument board, where it indicates the temperature of the cooling water in the engine. Thermometers of this type made here were, and still are, beng submitted to extensive tests.

Banking indicators are now used to show when a plane is correctly banked in making a turn. Spirit level, balance, and gyroscopic types are being used. The problem of indicating the extent to which a plane is inclined to the horizontal in the air is a very complicated one. No simple solution has yet been reached. Fortunately it is not often necessary to determine whether the plane is exactly horizontal, except in connection with bomb dropping. Development work is under way, which it is hoped will lead to improvement of devices already in use abroad.

The Aldis sight is used in connection with fixed guns firing through the propeller, has been copied, as regards its optical features, from an English instrument; but the construction has been modified in such a way that the behavior of the instrument in actual use will probably be very much improved. After a number of tests and experiments satisfactory instruments are now available. The makers have been assisted in recomputing the lenses to suit the optical glass available in this country. The illumination of these sights for night operation is also being studied.

Detroit S. A. E. Hears History of Gun Making

DETROIT, April 27—At the meeting of the Detroit section of the Society of Automotive Engineers held here last night, H. M. Jerome, chief engineer of the Chalkis Mfg. Co., presented a paper entitled "The History of Development of Gun Manufacture." The meeting was attended by nearly 300 of the local section members.

The paper dealt with the development of artillery, tracing its history from the first appearance of artillery in 1314 up to the 70-mile gun of 1918. The component parts of guns were explained and analyzed, together with some of the fundamentals of strength calculation and the factors which determine the dimensions. The importance of aircraft in directing artillery fire was also dwelt upon.

Lieutenant Explains

The discussion was handled by a lieutenant in the ordnance division who answered the questions and cleared up the doubtful points in the minds of those who heard the paper. Comment was made on the 70-mile gun, which the ordnance expert said was too expensive to warrant its manufacture. It was calculated that the cost of the gun was between $250,000 and $500,000, and that the probable line of shells which could be fired from it was 100.

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Minimum Coke Prices Fixed

WASHINGTON, April 29 — United States Fuel Administrator Garfield has announced the following minimum prices for coke at ovens:

	Blast Furnace	72 Hour Foundry Coke
Coalmont, Tenn.	$7.25	$8.25
Pratt Seam, Ala.	8.00	8.75
Marion and Harrison Counties, West Virginia	6.25	7.25
Barbour and Randolph Counties, West Virginia	6.25	7.25
New Mexico	..	9.50

In New Mexico the price for furnace and smelting coke has been set at $8.50.

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Walnut Lumber Needed

WASHINGTON, April 28—Manufacturers of veneer have been asked by the Ordnance Department to help save walnut for gun stocks and airplane propellers. Major E. A. Shepherd of the department has issued a letter to them, asking that they refrain from manufacturing veneer from walnut lumber other than butts, crotches or figured material, none of which is suitable for the stocks or propellers. This material is urgently needed by the Government.

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Trucks Move Emergency Fleet Corp.

WASHINGTON, April 28 — Motor trucks belonging to the United States Army will be used to move the office equipment of the Emergency Fleet Corp. from Washington to Philadelphia. Moving will begin on May 1 and it is hoped to have the task completed by May 15. Some idea of the size of this undertaking may be gained by the fact that the Emergency Fleet Corp. occupies 39 buildings in Washington.

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Huge Fuel Reserve

(*Continued from page* 869)

The second annual report of the Public Utilities Commission of Maine contains descriptions of many peat bogs in that state. Detailed information relating to the occurrence of this material in Maine and a map showing the location of workable deposits in that state can also be found in United States Geological Survey Bulletin 376.

It is estimated that more than 11,000 square miles of swamp land in the United States contain peat beds of good quality, and that the total available fuel in these deposits would amount to more than 12,000,000,000 tons, a quantity that could furnish heat and power for the entire country for many years. Much of this material exists in states that have no known deposits of coal and which, on account of their cold climate and manufacturing industries, consume large quantities of fuel, a constantly increasing percentage of which must be conveyed by rail and water from distant mines. According to a recent estimate by Prof. E. K. Soper in a paper on The Peat Deposits of Minnesota, published by the Minnesota Geological Survey, more than 6,000,000,000 tons of air-dried peat fuel can be obtained from deposits in that state alone. The utilization of these deposits would greatly augment the local fuel supply and would incidentally relieve the strain on our transportation facilities by furnishing fuel to an area where coal is now brought by the longest haul.—*Iron Trade Review.*

Chicago S. A. E. Discusses Kerosene Tractor Problems

CHICAGO, April 27—Need of special engine design to take care of the peculiar problems involved in the use of kerosene as a fuel for tractors, and the possibility of a return to the make and break ignition for slow-speed tractor engines, were the main features brought out in the technical session of the Mid-West Section of the S. A. E., at the Chicago Automobile Club last night.

"Magneto Ignition for Ford Tractors" was the title of a paper presented by J. G. Zimmerman, service engineer of the Sumter Electrical Co. This was illustrated by special slides showing oscillographs of the building up of current voltage and power in spark gaps of different lengths, and sparks produced by different ignition devices.

H. T. Sward, sales engineer of Fairbanks-Morse & Co., presented a paper on "The Oil-Burning Tractor Engine," in which he described in particular the engine used in the Fair-Mors tractor.

Officers were elected as follows: Chairman, G. W. Smith, assistant chief engineer of the Nash Motors Co., Kenosha, Wis.; treasurer, Lon R. Smith, sales engineer of the Buda Co., Harvey, Ill., and secretary, Darwin S. Hatch, editor of *Motor Age*, Chicago. C. S. Whitney, past chairman, automatically becomes vice-chairman, and George L. Lavery, past treasurer, becomes the fifth member of the Executive Board.

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Trucks Relieve Detroit Strike

DETROIT, April 30—The use of automotive vehicles during the recent street car strike in Detroit proved that a city is not dependent on its trolley system for transportation. Before it was definitely learned that there would be a strike, manufacturers of automobiles and war supplies gathered together all available trucks and mapped out routes for these to take in gathering up factory employees. Posters to this effect, giving the routes, were hung on bulletin boards.

When the strike was ordered the companies were prepared, and succeeded in gathering up a large percentage of both the day and night shifts. In addition to the posters, advertisements of truck routes were inserted in the daily newspapers. As a result of carefully laid plans, there was no serious loss in production due to the strike.

Calendar

RACING

May 16—Uniontown, Uniontown Speedway Assn.
May 30—Sheepshead Bay, N. Y. Championship races.
June 22 — Chicago, Chicago Speedway.
July 4—Cincinnati, Cincinnati Speedway.

ASSOCIATIONS

May 10—New York, Highway Traffic Assn. 8.30 P.M. Automobile Club of America Bldg.
May 13-18—Cleveland, War Convention of Machinery, Tool and Supply Industry of the United States.
June 3-4 — Chicago. National Gas Engine Assn. Eleventh Annual. Hotel Sherman.
June 5-12—Hot Springs, Va., National Assn. Automobile and Accessory Jobbers.
June 17-19—Dayton, O., Society Automotive Engineers, Annual Midsummer Session.

SHOWS

May 3-7 — Lima, Ohio, Ohio State Automobile Assn.
Sept. 23-28—Chicago, National Accessory Show for Fords. Coliseum.

ENGINEERING

June 26-28 — Buffalo, N. Y. American Society of Heating and Ventilating Engineers.
Sept. 2 — Cripple Creek, Colo. American Institute of Mining Engineers.
Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street